

**RCA TUBE
HANDBOOK
HB-3**

**THYRATRON
& IGNITRON
SECTION**



In this section, data are given for RCA Thyratrons and Ignitrons. Thyratrons are used in relay applications, in grid-controlled rectifier service and in motor-control service. Ignitrons have applications in welder-control service, power rectification, and power conversion.

*For further Technical Information, write to
Commercial Engineering, Tube Department,
Radio Corporation of America, Harrison, N. J.*



PRICES[□]
OF THYRATRON & IGNITRON TYPES
Schedule U[▲]

Type	Price
2021.....	\$ 2.00
3C23.....	12.50
3022.....	15.00
105.....	49.50
172.....	74.00
502-A.....	1.85
627.....	22.00
629 [♣]	13.00
672-A.....	35.00
676.....	55.00
677.....	55.00
884.....	1.85
885 [♣]	2.00
2050.....	1.85
5550.....	50.00
5551.....	80.50
5552.....	121.00
5553.....	265.00
5554.....	190.00
5555.....	370.00
5557.....	8.50
5559.....	22.00
5560.....	28.00
5563.....	47.00
5696.....	1.90

□ This price list applies only in the United States of America and is subject to change without notice. All prices are exclusive of all Federal, State and local excise, sales, and similar taxes.

▲ Schedule U shows user prices for tube types priced for distribution through other than dealer and service channels.

♣ Not recommended for new equipment design.

INFORMATION ON PURCHASING ABOVE TYPES

Information as to where RCA Thyratrons & Ignitrons can be purchased may be obtained from our regional office nearest you or from Tube Department, Radio Corporation of America, Harrison, N.J.

JUNE 1, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

THY. & IGN.
PRICES



THYRATRON & IGNITRON CLASSIFICATION CHART

When choosing tube types, the equipment designer should refer to the RCA PREFERRED TYPES LIST and its companion list - TYPES NOT RECOMMENDED for NEW EQUIPMENT DESIGN - both of which appear in the General section.

THYRATRONS							
Maximum Cathode [●] Amp.		Maximum Peak Inverse Anode Volts		Filament (F) or Heater (H)		TUBE TYPE	
Av.	Peak			Volts	Amp.		
Triodes							
<i>Mercury-Vapor Types</i>							
0.5	2.0	5000	40-80°C	2.5 F	5.0		5557
0.64	2.5	2500	25-70°	2.5 F	6.0		627
1.5	6.0	1250	-40 to +80°	2.5 F	7.0		3C23
{ 1.6	6.4	20000	25-50°	5.0 F	10.0		5563-A
{ 1.8	10.0	15000	25-55°				
2.5	15.0	1000	40-80°	5.0 H	4.5		5559
2.5	15.0	1000	40-80°	5.0 H	4.5		5728/FG-67
4.0	15.0	10000	30-50°	5.0 H	10.0		677
{ 6.4	40.0	2500	40-80°	5.0 H	10.0		676
{ 2.5 [▲]	77.0 [▲]	750 [▲]	40-90°				
<i>Gas Types</i>							
0.04	0.2	350	-40 to +70°	2.5 H	2.6		629
0.045	35	■	-50 to +90°	6.3 H	2.3		6130/3C45†
{ 0.075	0.3	300 [⊛]	-75 to +90°	6.3 H	0.6		884
{ 0.075	0.3	350 [⊛]	-75 to +90°				
Same as for Type 884				2.5 H	1.5		885
Tetrodes							
<i>Mercury-Vapor Types</i>							
2.5	15.0	1000	40-80°	5.0 H	4.5		5560
3.2	40.0	2500	40-80°	5.0 H	5.0		672-A
{ 6.4	40.0	2000	40-80°	5.0 H	10.0		172†
{ 2.5 [▲]	77.0 [▲]	750 [▲]	30-95°				
6.4	40.0	2500	40-80°	5.0 H	10.0		105
{ 4.0*	16.0*	10000*	25-50°				
<i>Gas Types</i>							
0.025	0.1	500	-55 to +90°	6.3 H	0.15		5696 [□]
0.1	0.5	1300	-75 to +90°	6.3 H	0.6		2021 [□]
0.1	1.0	1300	-55 to +90°	6.3 H	0.6		502-A [□]
0.1	1.0	1300	-75 to +90°	6.3 H	0.6		2050
0.5	5.0	1300	-75 to +90°	6.3 H	2.6		6012
0.8	8.0	1500	-75 to +90°	6.3 H	2.6		3022

● In these two columns, values for filament types are for Maximum Anode Amperes.
▲ Welder-Control Service.
■ See Tube Data.
† Hydrogen Thyatron.
⊛ Relaxation Oscillator (Sweep-Circuit Service).
* Relay & Grid-Controlled Rectifier Service.
† Metal-Shell Type. * Intermittent Service. □ Miniature Type.

● In these two columns, values for filament types are for Maximum Anode Amperes.

▲ Welder-Control Service.

■ See Tube Data.

† Hydrogen Thyatron.

⊛ Relaxation Oscillator (Sweep-Circuit Service).

* Relay & Grid-Controlled Rectifier Service.

† Metal-Shell Type. * Intermittent Service.

□ Miniature Type.

MAY 1, 1955

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

THY. & IGN.
CLASS. CHART



THYRATRON & IGNITRON CLASSIFICATION CHART

IGNITRONS						
Maximum Ratings For frequencies from 25 to 60 cps						TUBE TYPE
Av. Anode Amp.	Peak Anode Amp.	KVA Demand	Av'g'g Time Sec.	RMS Supply Volts	Peak Inverse or Forward Volts	
AC Welder-Control Service†						
22.4	550	100	22	250	—	5550 Size A
22.4	230	100	9.2	600	—	
12.1	1680	300	22	250	—	
12.1	700	300	9.2	600	—	
56	1130	200	18	250	—	5551 Size B
56	470	200	7.5	600	—	
30.2	3350	600	18	250	—	
30.2	1400	600	7.5	600	—	
113	360	600▲	0.5	2400	—	5554
75	720	1200	1.5	2400	—	
140	2240	400	14	250	—	5552 Size C
140	930	400	5.8	600	—	
75.6	6730	1200	14	250	—	
75.6	2800	1200	5.8	600	—	
207	650	1105▲	0.5	2400	—	5555
135	1400	2400	1.66	2400	—	
355	4500	800	11	250	—	5553 Size D
355	1870	800	4.6	600	—	
192	13500	2400	11	250	—	
192	5600	2400	4.6	600	—	
Frequency-Changer Resistance-Welding Service						
56	336	—	6.25	—	1500	5822
16	1200	—	6.25	—	1500	
70	420	—	6.25	—	1200	
20	1500	—	6.25	—	1200	
Rectifier Service						
200	1800	—	—	—	900	5555
150	1200	—	—	—	2100	
100	900	—	—	—	900	5554
75	600	—	—	—	2100	
Intermittent Rectifier Service						
100	1600	—	6	—	500	5552
40	700	—	6	—	500	5551

† Ratings shown are on a per tube basis with two tubes connected in in-verse parallel.

▲ 100% duty.

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▲ 100% duty.

MAY 1, 1955

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

THY. & IGN.
CLASS. CHART



2D21

THYRATRON

GAS TETRODE, MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:	Min.	Av.	Max.	
Voltage (AC or DC)	5.7	6.3	6.9	volts
Current, with heater volts = 6.3	0.54	0.60	0.66	amp
Cathode:				
Heating Time, prior to tube conduction.	10	-	-	sec
Direct Interelectrode Capacitances (Approx.): ⁰				
Grid No.1 to Anode.		0.026		μ if
Input		2.4		μ if
Output.		1.6		μ if
Ionization Time (Approx.):				
For conditions: dc anode volts = 100; grid-No. 1 square-pulse volts = 50; peak anode amp. during conduction = 0.5		0.5		μ sec
Deionization Time (Approx.):				
For conditions: dc anode volts = 125; grid-No. 1 volts = -100; grid-No. 1 resistor (ohms) = 1000; dc anode amp. = 0.1		35		μ sec
For conditions: dc anode volts = 125; grid-No. 1 volts = -10; grid-No. 1 resistor (ohms) = 1000; dc anode amp. = 0.1		75		μ sec
Maximum Critical Grid Current, with ac anode- supply volts (rms) = 460, and average anode amp. = 0.1		0.5		μ amp
Anode Voltage Drop (Approx.).		8		volts
Grid-No. 1 Control Ratio (Approx.) with grid-No. 1 resistor (megohms) = 0; grid-No. 2 volts = 0				250
Grid-No. 2 Control Ratio (Approx.) with grid-No. 1 resistor (megohms) = 0; grid-No. 2 resistor (megohms) = 0; grid-No. 1 volts = 0				1000

⁰ Without external shield.

Mechanical:

Mounting Position	Any
Maximum Overall Length.	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (excluding tip).	1-1/2" $\pm$ 3/32"
Maximum Diameter.	3/4"
Bulb.	T-5-1/2
Base.	Small-Button Miniature 7-Pin
Basing Designation for BOTTOM VIEW.	7BN

Pin 1-Grid No. 1
Pin 2-Cathode
Pin 3-Heater
Pin 4-Heater



Pin 5-Grid No. 2
Pin 6-Anode
Pin 7-Grid No. 2

← Indicates a change.

JUNE 15, 1948

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA

2021



2021

THYRATRON

RELAY and GRID-CONTROLLED RECTIFIER SERVICE

Maximum Ratings, Absolute Values:

PEAK ANODE VOLTAGE:

Forward.	650 max.	volts
Inverse.	1300 max.	volts

GRID-No.2 (SHIELD-GRID) VOLTAGE:

Peak, before anode conduction.	-100 max.	volts
Average, during anode conduction [■]	-10 max.	volts

GRID-No.1 (CONTROL-GRID) VOLTAGE:

Peak, before anode conduction.	-100 max.	volts
Average, during anode conduction [■]	-10 max.	volts

CATHODE CURRENT:

Peak	0.5 max.	amp
Average [■]	0.1 max.	amp
Surge, for duration of 0.1 sec. max. . . .	10 max.	amp

GRID-No.2 CURRENT:

Average [■]	+0.01 max.	amp
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GRID-No.1 CURRENT:

Average [■]	+0.01 max.	amp
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PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode .	100 max.	volts
Heater positive with respect to cathode .	25 max.	volts

AMBIENT TEMPERATURE RANGE.	-75 to +90	°C
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Typical Operating Conditions for Relay Service:

RMS Anode Voltage.	117	400	..	volts
Grid-No.2 Voltage.	0	0	..	volts
RMS Grid-No.1 Bias Voltage [□]	5	-	..	volts
DC Grid-No.1 Bias Voltage	-	-6	..	volts
Peak Grid-No.1 Signal Voltage.	5	6	..	volts
Grid-No.1-Circuit Resistance	1.0	1.0	..	megohms
Anode-Circuit Resistance [#]	1200	2000	..	ohms

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	10 max.	megohms
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■ Averaged over any interval of 30 sec. max.

□ Approximately 180° out of phase with the anode voltage.

Sufficient resistance, including the tube load, must be used under any conditions of operation to prevent exceeding the current ratings.

→ Indicates a change.

JUNE 15, 1948

TUBE DEPARTMENT

DATA

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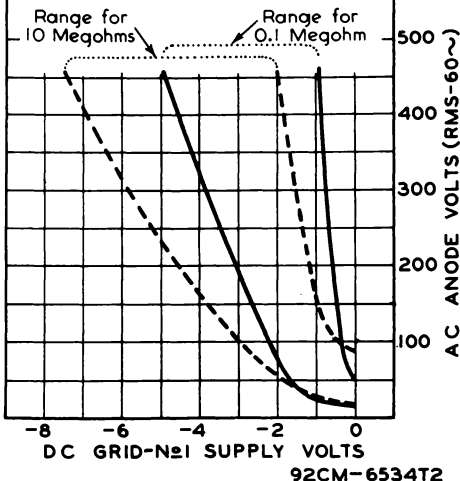
2D21

THYRATRON

2D21

OPERATIONAL RANGE OF CRITICAL GRID VOLTAGE

TYPE 2D21 SHIELD-GRID VOLTS=0
RANGES SHOWN ARE FOR TWO VALUES
OF GRID RESISTOR - 0.1 MEG. AND 10
MEG. - AND TAKE INTO ACCOUNT INITIAL
DIFFERENCES BETWEEN INDIVIDUAL
TUBES & SUBSEQUENT DIFFERENCES
DURING TUBE LIFE, FOR A HEATER-
VOLTAGE RANGE OF 5.7 TO 6.9 VOLTS

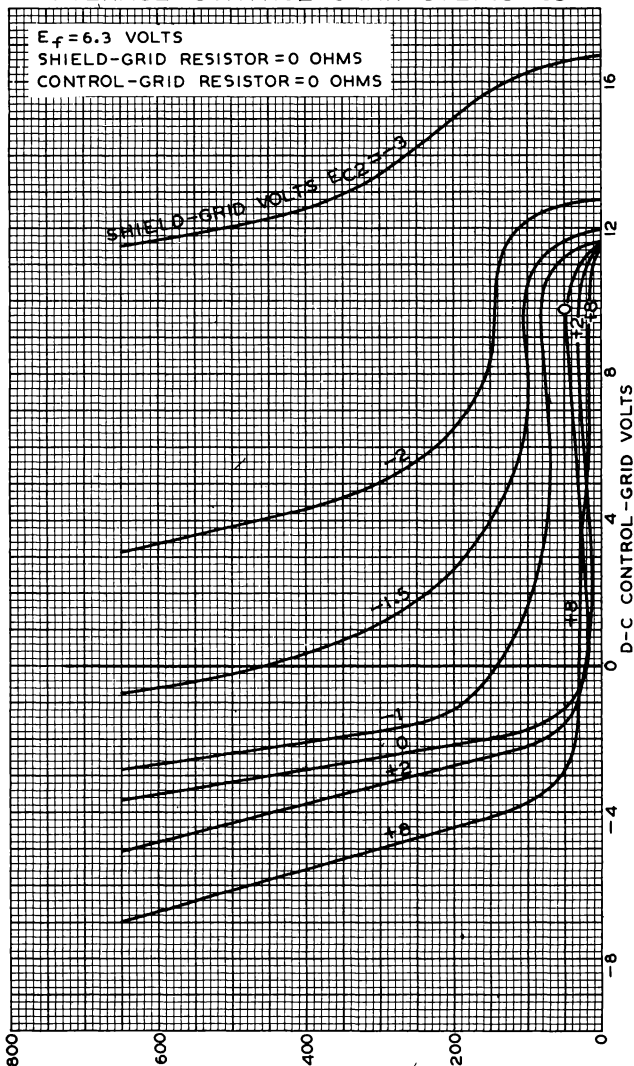




2D21

2D21

AVERAGE CONTROL CHARACTERISTICS



MAY 2, 1944

D-C ANODE VOLTS

RCA VICTOR DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6531R1

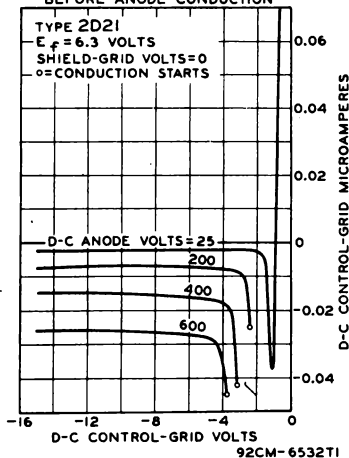
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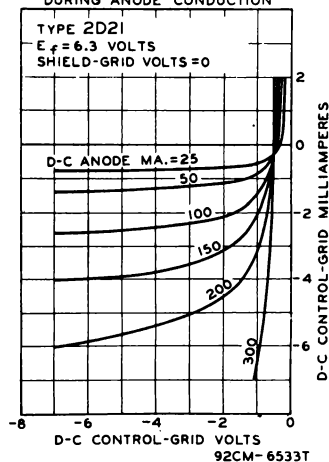
2D21

THYRATRON

AVERAGE GRID CHARACTERISTICS
BEFORE ANODE CONDUCTION



AVERAGE GRID CHARACTERISTICS
DURING ANODE CONDUCTION



APRIL 1, 1944

RCA VICTOR DIVISION
 RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6532T1
 92CM-6533T



3C23

3C23

GAS-AND-MERCURY-VAPOR THYRATRON

NEGATIVE-CONTROL TRIODE TYPE

GENERAL DATA**Electrical:**

Filament, Coated:

Voltage 2.5 $\pm$ 5% ac or dc volts $\leftarrow$

Current at 2.5 volts. 7 amp

Minimum heating time prior to
tube conduction 15 secDirect Interelectrode Capacitance (Approx.):^oGrid to anode 1.8 μ f $\leftarrow$ Ionization Time (Approx.): $\leftarrow$ For conditions: dc anode volts = 100,
peak grid volts = +30, and peak
anode amperes = 6 3 μ sec $\leftarrow$ Deionization Time (Approx.): $\leftarrow$ For conditions: dc anode volts = 120,
dc grid-supply volts = -20, grid re-
sistor (ohms) = 10000, and dc
anode amperes = 1.5 360 μ secFor conditions: dc anode volts = 120,
dc grid-supply volts = -500, grid re-
sistor (ohms) = 100000, and dc
anode amperes = 1.5 60 μ sec

Anode Voltage Drop (Approx.). 15 volts

Mechanical:

Mounting Position Vertical, base down

Maximum Overall Length. 6-1/8"

Seated Length 5-1/4" $\pm$ 1/4"

Maximum Diameter 2-1/16"

Cooling Natural circulation of air around tube

Weight (Approx.) 3 oz

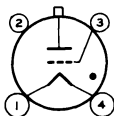
Bulb. ST-16

Cap Medium (JETEC No. C1-5) $\leftarrow$ Base. Medium-Shell Small 4-Pin $\leftarrow$ with Bayonet (JETEC No. A4-10) $\leftarrow$ Basing Designation for BOTTOM VIEW 3G $\leftarrow$

Pin 1-Filament

Pin 2-No Connec-
tion

Pin 3-Grid



Pin 4-Filament

Cap-Anode

CONTROL SERVICE**Maximum Ratings, Absolute Values:** For supply frequency up to 400 cpsOperating Condensed-Mercury
Temperature Range

-40° to +100°C -40° to +80°C

PEAK ANODE VOLTAGE:

Forward 200 max. 1250 max. volts

Inverse 200 max. 1250 max. volts

^o without external shield. $\leftarrow$ Indicates a change.

3C23



3C23

GAS-AND-MERCURY-VAPOR THYRATRON

Operating Condensed-Mercury
Temperature Range
-40° to +100°C -40° to +80°C

GRID VOLTAGE:

Peak or DC, before tube conduction	-500 max.	-500 max.	volts
Average [▲] , during tube conduction	-10 max.	-10 max.	volts

ANODE CURRENT:

Peak	6 max.	6 max.	amp
Average [●]	1.5 max.	1.5 max.	amp
Fault, for duration of 0.1 second max.	120 max.	120 max.	amp

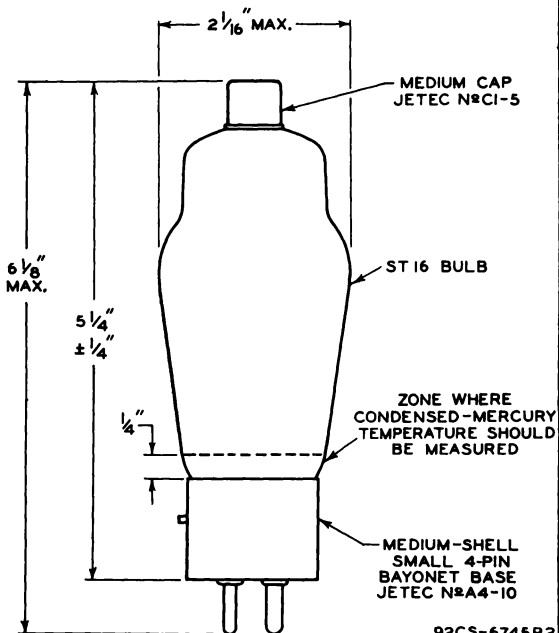
GRID CURRENT:

Average [●]	+0.01 max.	+0.01 max.	amp
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▲ Averaged over one conducting period.

● Averaged over any interval of 5 seconds maximum.

● Averaged over period of grid conduction.



92CS-6745R2



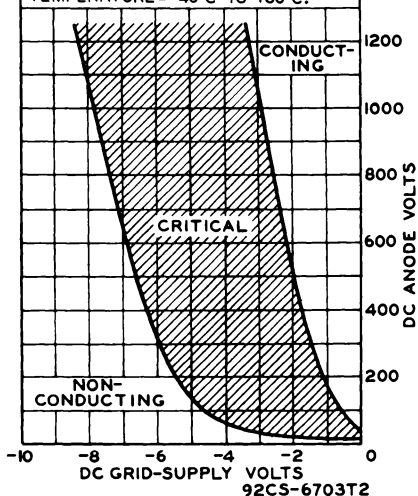
3C23

3C23

GAS - AND - MERCURY-VAPOR THYRATRON

OPERATIONAL RANGE OF CRITICAL GRID VOLTAGE

RANGE IS FOR CONDITIONS WHERE:
 $E_f = 2.5$ VOLTS AC $\pm 5\%$; CIRCUIT RE-
TURNS TO CENTER TAP OF FILAMENT
TRANSFORMER. THE RANGE INCLUDES
INITIAL AND LIFE VARIATIONS OF IN-
DIVIDUAL TUBES. GRID RESISTOR = 0
TO 100000 OHMS. CONDENSED-MERCURY
TEMPERATURE = -40°C TO $+80^\circ\text{C}$.





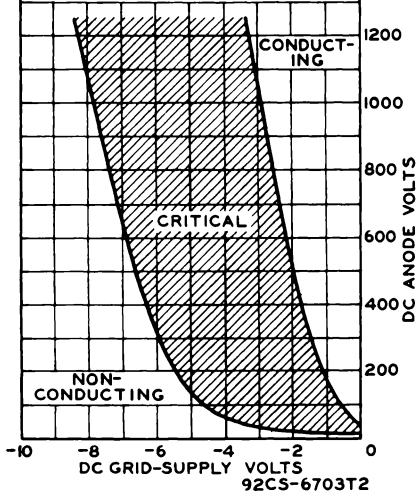
3C23

3C23

GAS-AND-MERCURY-VAPOR THYRATRON

OPERATIONAL RANGE OF CRITICAL GRID VOLTAGE

RANGE IS FOR CONDITIONS WHERE:
 $E_f = 2.5$ VOLTS AC $\pm 5\%$; CIRCUIT RE-
TURNS TO CENTER TAP OF FILAMENT
TRANSFORMER. THE RANGE INCLUDES
INITIAL AND LIFE VARIATIONS OF IN-
DIVIDUAL TUBES. GRID RESISTOR = 0
TO 100000 OHMS. CONDENSED-MERCURY
TEMPERATURE = -40°C TO $+80^\circ\text{C}$.





3C45

3C45

HYDROGEN THYRATRON

POSITIVE-CONTROL, TRIODE TYPE

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathode:

Voltage 6.3 ^{+5%}_{-10%} ac or dc volts

Current at 6.3 volts:

Minimum 2.0 amp

Average 2.3 amp

Maximum 2.5 amp

Minimum Heating Time 2 minutes

Direct Interelectrode Capacitances (Approx.):

Grid to Anode 3.9 μ fGrid to Cathode 8.6 μ fIonization Time (Approx.)[□] 0.6 μ secDeionization Time (Approx.) 25 μ sec

Anode-Cathode Voltage Drop (Approx.):

At middle of pulse duration 150 volts

Maximum Variation in Firing Time (Jitter) 0.06 μ sec**Mechanical:**

Operating Position Any

Overall Length 4-3/4" $\pm$ 1/4"Seated Length 4-1/8" $\pm$ 1/4"

Maximum Diameter 1-9/16"

Bulb T-12

Cap Small (JETEC No.C1-1)

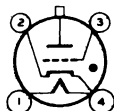
Base Medium-Shell Small 4-Pin, Micanol (JETEC No.A4-9)

BOTTOM VIEW

Pin 1-Heater

Pin 2-Cathode

Pin 3-Grid



Pin 4-Heater,

Cathode

Cap-Anode

Cooling Natural

PULSE MODULATOR SERVICE**Maximum and Minimum CCS* Ratings, Absolute Values:**

DC ANODE-SUPPLY VOLTAGE 800 min. volts

[□] Defined as the time interval between the point on the rising portion of the grid pulse which is 26% of the peak unloaded pulse amplitude and the point on the anode-current pulse which is 26% of its peak amplitude. The anode-current pulse has a time rise of 0.05 microsecond maximum. The grid pulse has a peak amplitude of 130 volts minimum, has a rise time of 0.5 microsecond maximum, and is supplied by a driver having 1500 ohms maximum internal impedance.

* Continuous Commercial Service.

SEPT. 1, 1952

TUBE DEPARTMENT

TENTATIVE DATA 1

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

3C45



3C45

HYDROGEN THYRATRON

PEAK ANODE VOLTAGE:

Forward (E_{bm}) [*]	3000 max.	volts
Inverse	5% of E_{bm} min.	volts
After anode-current pulse: [▲]		
During first 25 μ sec	1500 max.	volts
After first 25 μ sec	3000 max.	volts

GRID VOLTAGE:

Negative (DC or Peak), before conduction	200 max.	volts
Peak Positive Pulse	175 min.	volts

ANODE CURRENT:

Peak	35 max.	amp
Average [°]	0.045 max.	amp
Rate of Rise	750 max.	amp/ μ sec

OPERATION FACTOR[†] 3×10^8 max.PULSE DURATION[▲] 6 max. μ sec

AMBIENT TEMPERATURE -50 to +90 °C

Typical Operation[†] at 2000 pps in Circuit of Fig.1:

	Pulse Duration of 0.5 μ sec	
DC Anode-Supply Voltage	1250	volts
Peak Anode Voltage:		
Forward	3000	volts
Inverse:		
Immediately after anode- current pulse	530	volts
Grid Voltage:		
Negative, before conduction	0	volts
Peak Positive Pulse (Unloaded)	175	volts
Effective Grid-Circuit Resistance	1000	ohms
Anode Current:		
Peak	35	amp
Average [°]	0.035	amp
Operation Factor [†]	2.1×10^8	
Peak Power Output to Pulse Transformer (T)	43000	watts

Maximum Circuit Values:

Effective Grid-Circuit Resistance 1500 max. ohms

* In applications where the anode voltage is applied instantaneously, the power-supply filter should be designed so that the peak forward anode voltage is applied at a rate not to exceed 75000 volts per second.

▲ Exclusive of spike not having more than 0.05 microsecond duration.

† Operation with a bulb temperature within the approximate range of 60° to 90°C measured on the bulb directly opposite the anode is recommended for longest life. To attain this temperature under operating conditions involving low ambient temperature, the use of a heat-conserving enclosure for the tube may be necessary.

° Averaged over any cycle.

†, °: See next page.

SEPT. 1, 1952

TUBE DEPARTMENT

TENTATIVE DATA 1

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



3C45

3C45

HYDROGEN THYRATRON

† Defined as *Peak Forward Anode Volts* x *Pulse Repetition Rate (pps)* x *Peak Anode Amperes* (excluding spike).

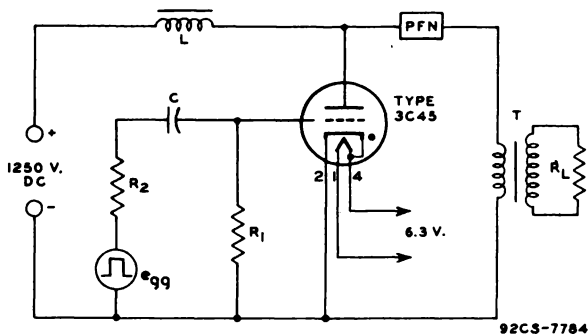
• Pulse duration is defined as the time interval between points on the pulse envelope at which instantaneous amplitudes are equal to 70.7% of the maximum amplitude excluding spike.

OPERATING CONSIDERATIONS

The *ambient-temperature operating range* for the 3C45 extends from -50° to $+90^{\circ}\text{C}$ (-58° to $+194^{\circ}\text{F}$). Within this range, there is no appreciable effect on the electrical characteristics of the tube. However, for longest life, it is recommended that the tube be operated with a *bulb temperature* within the approximate range of 60° to 90°C (140° to 194°F). Under no circumstances should a stream of cooling air be applied to the glass envelope.

The *Connector* for the anode cap should be of the heat-radiating type and should have ample current-carrying capability for the operating requirements.

Fig. 1 - Typical Pulse-Modulator Circuit
Operating at 2000 pps.



C: Blocking Capacitor, $0.001 \mu\text{f}$

egg: Pulse Generator supplying peak positive pulse grid voltage of 175 volts (unloaded)

L: Charging Choke, 5 henries

PFN: Pulse-Forming Network with iterative impedance of 50 ohms, and a two-way transmission time of 0.5 microsecond

R_1 : Grid Resistor, 30000 ohms

R_2 : Effective Resistance of grid circuit, 1000 ohms

R_L : Load Resistance. Value reflected into primary of transformer (T) is 35 ohms.

T: Matching Pulse Transformer

SEPT. 1, 1952

TUBE DEPARTMENT

TENTATIVE DATA 2

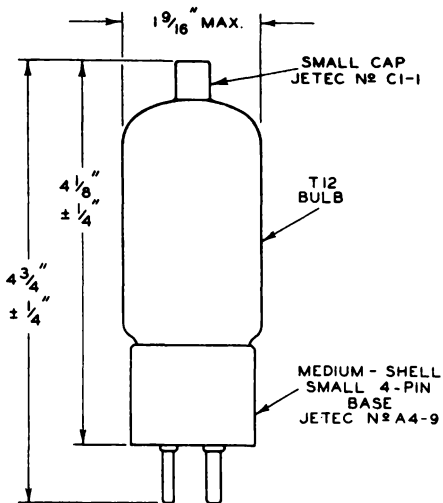
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

3C45



3C45

HYDROGEN THYRATRON



92CS - 7757

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SEPT. 1, 1952

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-7757



3D22-A GAS THYRATRON

NEGATIVE-CONTROL TETRODE TYPE

Supersedes Type 3D22

3D22-A

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

	Min.	Av.	Max.	
Voltage	5.7	6.3	6.9	ac or dc volts
Current at 6.3 volts. . .	-	2.6	2.85	amp

Cathode:

Minimum heating time prior to tube conduction.	30	sec
Maximum outage time without reheating.	3	sec

Direct Interelectrode Capacitances

(Approx.):^o

Grid No.1 to anode*.	0.1	μmf
Grid No.1 to cathode, grid No.2, base shell, and heater	8.5	μmf
Anode to cathode, grid No.2, base shell, and heater	4.6	μmf

Ionization Time (Approx.):

For conditions: dc anode volts = 100, grid-No.1 square-pulse volts = +100, and peak anode amperes during conduction = 8	0.5	μsec
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Deionization Time (Approx.):

For conditions: dc anode volts = 125, dc grid-No.1 volts = -200, grid-No.1 resistor (ohms) = 1000, and dc anode amperes = 0.8.	150	μsec
For conditions: dc anode volts = 125, dc grid-No.1 volts = -14.8, grid-No.1 resistor (ohms) = 1000, and dc anode amperes = 0.8.	400	μsec

Maximum Critical Grid-No.1 Current:

For conditions: ac anode-supply volts = 460 (rms), and average anode amperes = 0.8.	0.8	μamp
Anode Voltage Drop (Approx.)	10	volts

Grid-No.1 Control Ratio (Approx.):

For conditions: grid-No.1 resistor (megohms) = 0 to 0.1, grid-No.2 resistor (megohms) = 0, and grid-No.2 volts = 0	150	
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Grid-No.2 Control Ratio (Approx.):

For conditions: grid-No.1 resistor (megohms) = 0, grid-No.2 resistor (megohms) = 0 to 0.1, and grid-No.1 volts = -3	650	
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^o Without external shield.

* With all other electrodes and base shell connected to ground.

3D22-A



3D22-A GAS THYRATRON

Mechanical:

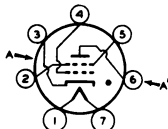
Mounting Position.	Any
Maximum Overall Length.	4-5/8"
Maximum Seated Length.	4"
Maximum Diameter.	2-3/8"
Weight (Approx.)	5 oz
Bulb.	T-16
Base.	Medium-Metal-Shell Giant 7-Pin with Bayonet (JETEC No.A7-17)
Basing Designation for BOTTOM VIEW.	.7BV

Pin 1 - Heater

Pin 2 - Grid No.2

Pin 3 - Cathode

Pin 4 - Grid No.1



Pin 5 - Grid No.2

Pin 6 - Anode

Pin 7 - Heater

AA' = PLANE OF ELECTRODES

RELAY AND GRID-CONTROLLED RECTIFIER SERVICE

Maximum Ratings, Absolute Values:

PEAK ANODE VOLTAGE:

Forward.	650 max.	volts
Inverse.	1500 max.	volts

GRID-No.2 (SHIELD-GRID) VOLTAGE:

Peak, before tube conduction.	-100 max.	volts
Average#, during tube conduction.	-10 max.	volts

GRID-No.1 (CONTROL-GRID) VOLTAGE:

Peak or DC, before tube conduction.	-200 max.	volts
Average#, during tube conduction.	-10 max.	volts

CATHODE CURRENT:

Peak.	8 max.	amp
Average#.	0.8 max.	amp
Fault, for duration of 0.1 second max.	30 max.	amp

AVERAGE GRID-No.2 CURRENT#

.	+0.1 max.	amp
-----------	-----------	-----

AVERAGE GRID-No.1 CURRENT#

.	+0.05 max.	amp
-----------	------------	-----

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode.	100 max.	volts
Heater positive with respect to cathode.	25 max.	volts
AMBIENT-TEMPERATURE RANGE.	-75 to +90	°C

Maximum Circuit Values:

Grid-No.1-Circuit Resistance.	2 max.	megohms
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Averaged over any interval of 30 seconds maximum.



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3D22-A GAS THYRATRON

SPECIAL PERFORMANCE TESTS

Made in conformance with indicated sections of
MIL-E-1B Specifications dated 2 May 1952

4.9.19.2 (F-66) High-Frequency Vibration:

The tube is rigidly mounted on a table vibrating with simple harmonic motion at a frequency of 50 ± 2 cps with a fixed amplitude of $0.040'' \pm 0.0025''$ (total excursion is double the amplitude). Maximum acceleration is 10g. No voltage is applied during vibration. Tube is vibrated for 10 minutes in such manner that table motion is along shortest line between anode and cathode. This test will not cause tube to be inoperative.

4.10.19 (F-64) Thyatron High-Voltage Operation:

Min. Max.

Grid-No.1 Supply Voltage (1) -4.4 -9.2 volts

This test is made after two light taps with a felt hammer (similar to type used for noise tests) in direction from cathode to anode under the following conditions: heater voltage of 6.3 volts rms, anode supply voltage of 500 volts rms, grid No.2 tied to cathode, load resistance of 2000 ohms, and grid-No.1 circuit-resistance of 2 megohms. Tube conduction is indicated by an oscilloscope connected between anode and cathode and ceases when the grid-No.1 supply voltage is increased negatively within indicated range.

Grid-No.1 Supply Voltage (2) -4.4 -9.2 volts

This test is made as for Grid-No.1 Supply Voltage (1), except that the taps are made in direction from anode to cathode.

Voltage Difference - 1 volt

The difference between the value of grid-No.1 supply voltage in the first and second grid-No.1 supply voltage tests will not exceed the specified value.

OPERATING CONSIDERATIONS

Sufficient *anode-circuit resistance*, including the tube load, must be used under any conditions of operation to prevent exceeding the current ratings of the tube.

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GRID-CONTROLLED RECTIFIER CIRCUITS

DC Voltage Control

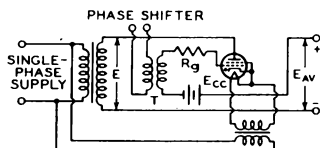


FIG. 1 HALF-WAVE SINGLE-PHASE

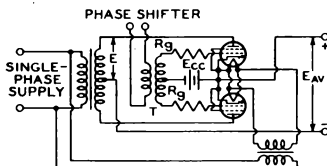


FIG. 2 FULL-WAVE SINGLE-PHASE

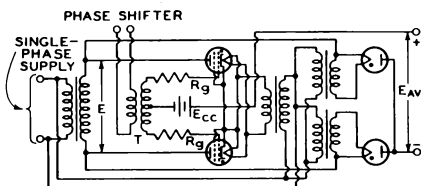


FIG. 3 SERIES SINGLE-PHASE

AC Voltage Control

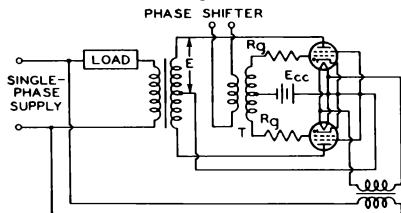


FIG. 4 FULL-WAVE SINGLE-PHASE

NOTES

92CL-8596

T=PEAKING TRANSFORMER

IN FIG. 3, THE RECTIFIER TUBES MAY BE 3D22-A's USED AS DIODES. THE 3D22-A IS USED AS A DIODE BY CONNECTING GRIDS N°2 AND N°1 TO CATHODE (PIN 3)

Devices and arrangements shown or described herein may use patents of RCA or others. Information contained herein is furnished without responsibility by RCA for its use and without prejudice to RCA's patent rights.



3D22-A

3D22-A

GRID - CONTROLLED RECTIFIER CIRCUITS

Numerical Relationships Among Electrical Quantities

E = Trans. Sec. Voltage (RMS)	I_{av} = Average DC Output Current
E_{av} = Average DC Output Voltage	I_b = Average Anode Current
E_{bmf} = Peak Forward Anode Voltage	I_p = Anode Current (RMS)
E_{bmi} = Peak Inverse Anode Voltage	I_{pm} = Peak Anode Current
E_m = Peak DC Output Voltage	P_{ac} = Load Volt-Amperes
E_r = Major Ripple Voltage (RMS)	P_{a1} = Line Volt-Amperes
f = Supply Frequency	P_{ap} = Trans. Pri. Volt-Amperes
f_r = Major Ripple Frequency	P_{as} = Trans. Sec. Volt-Amperes
	P_{dc} = DC Power ($E_{av} \times I_{av}$)

Note: Conditions assumed involve sine-wave supply; zero voltage drop in tubes; no losses in transformer and circuit; no back emf in the load circuit; and no phase-back.

RATIO	Fig. 1	Fig. 2	Fig. 3	Fig. 4
Voltage Ratios				
E/E_{av}	2.22	1.11	1.11	-
E_{bmi}/E	1.41	2.83	1.41	1.41
E_{bmi}/E_{av}	3.14	3.14	1.57	-
E_m/E_{av}	3.14	1.57	1.57	-
E_r/E_{av}	1.11	0.472	0.472	-
E_{bmf}/E :				
Resistive Load	1.41	1.41	1.41	1.41
Inductive Load [■]	1.41	2.83	1.41	1.41
Frequency Ratio				
f_r/f	1	2	2	-
Current Ratios				
I_p/I_{av}	1.57	0.785	0.785	-
I_b/I_{av}	1	0.5	0.5	-
Resistive Load				
I_{pm}/I_{av}	3.14	1.57	1.57	-
I_{pm}/I_b	3.14	3.14	3.14	3.14
Inductive Load [■]				
I_{pm}/I_{av}	--	1	1	-
Power Ratios				
$P_{ac}/I_b E_{bmf}$	--	-	-	1.57
Resistive Load				
P_{as}/P_{dc}	3.49	1.74	1.24	-
P_{ap}/P_{dc}	2.69	1.23	1.24	-
P_{a1}/P_{dc}	2.69	1.23	1.24	-

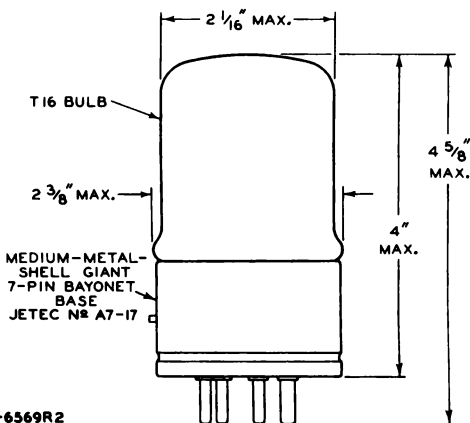
[■]: See next page.

3D22-A



3D22-A GAS THYRATRON

RATIO	Fig. 1	Fig. 2	Fig. 3	Fig. 4	
Power Ratios (Cont'd)					
Inductive Load [■]					
P_{as}/P_{dc}	--	1.57	1.11	-	
P_{ap}/P_{dc}	--	1.11	1.11	-	
P_{al}/P_{dc}	--	1.11	1.11	-	
[■] The use of a large filter-input choke is assumed, except for the circuit in Fig.4.					
CIRCUIT Single-Phase	MAX. TRANS. SEC. VOLTS (RMS) E	APPROX. DC OUTPUT VOLTS TO FILTER E _{av}	MAX. DC OUTPUT AMPERES I _{av}	MAX. DC OUTPUT WATTS TO FILTER P _{dc}	MAX. AC OUTPUT VOLT- AMPERES P _{ac}
Fig. 1 Half-Wave	460	205	0.8	165	-
Fig. 2 Full-Wave: Resistive Load	460	410	1.6	660	-
Inductive Load	230	205	1.6	330	-
Fig. 3 Series	460	410	1.6	660	-
Fig. 4 Full-Wave	460	-	-	-	800



JULY 1, 1955

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RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA 3

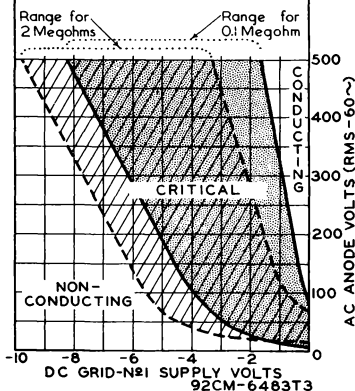


3D22-A

3D22-A GAS THYRATRON

OPERATIONAL RANGE OF CRITICAL GRID-N^o1 VOLTAGE

GRID N^o2 (SHIELD) CONNECTED TO CATHODE. RANGES SHOWN ARE FOR TWO VALUES OF GRID-N^o1 RESISTOR, 0.1 MEG. AND 2 MEG. AND TAKE INTO ACCOUNT INITIAL DIFFERENCES BETWEEN INDIVIDUAL TUBES AND SUBSEQUENT DIFFERENCES DURING TUBE LIFE, FOR HEATER-VOLTAGE RANGE OF 5.7 TO 6.9 VOLTS, AND FOR AN AMBIENT TEMPERATURE RANGE OF -40 TO +90 °C.

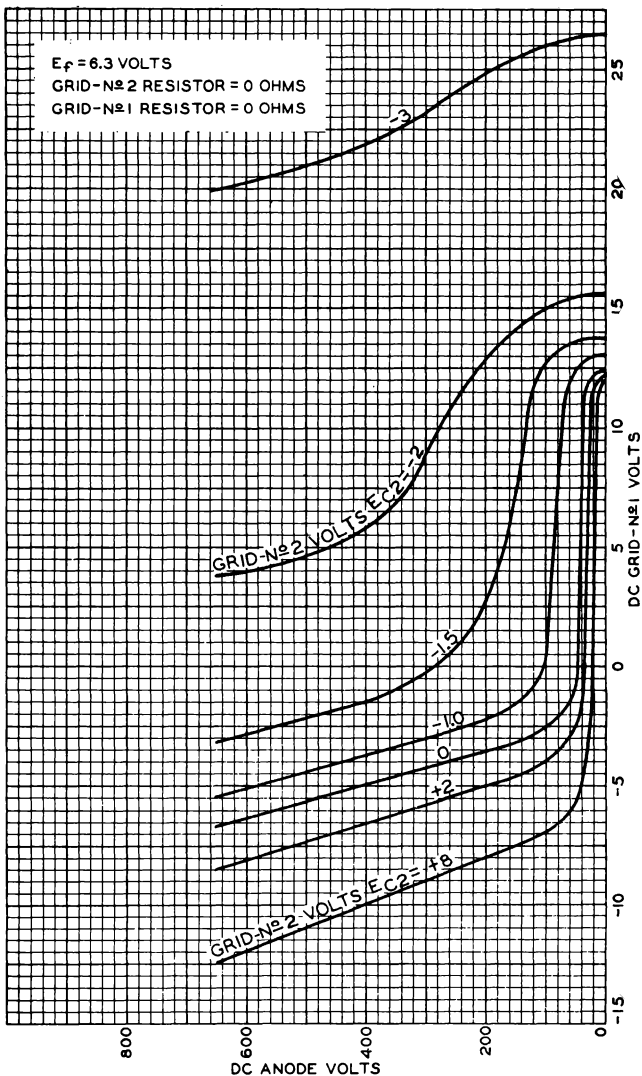


3D22-A



3D22-A

AVERAGE CONTROL CHARACTERISTICS



JAN. 22, 1947

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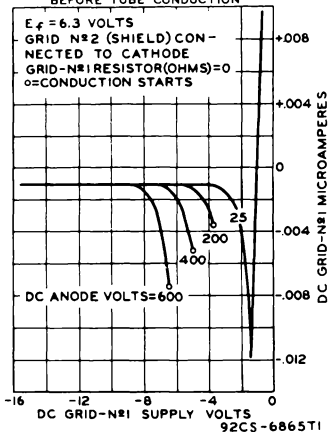
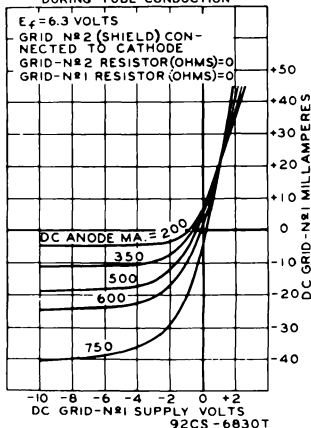
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3D22-A

CHARACTERISTIC CURVES

3D22-A

AVERAGE GRID-Nº1
CHARACTERISTICS
BEFORE TUBE CONDUCTIONAVERAGE GRID-Nº1
CHARACTERISTICS
DURING TUBE CONDUCTION



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THYRATRON MERCURY-VAPOR TETRODE

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Electrical:DATA

<u>Theoretical.</u>	<u>Continuous Service</u>		<u>Intermittent Service</u>		
Heater, for Unipotential Cathode:					
Voltage*	5.0	5.0	5.5	5.0	volts
Current.	10.0	10.0	11.0	10.0	amp
Direct Interelectrode Capacitance:					
Grid-No.1 to Anode (Approx.)	0.3	0.3	0.3	0.3	μuf
Peak Voltage Drop (Approx.). .	16	16	16	16	volts
Approx. Control Characteristics:					
Anode Voltage.	100	1000	100	1000	volts
Grid-No.2 Voltage.	0	0	0	0	volts
Grid-No.1 Voltage.	+1	-9	+1	-9	volts
Ionization Time (Approx.). . .	10	10	10	10	μsec.
Deionization Time (Approx.). .	1000	1000	1000	1000	μsec.

Mechanical:

Mounting Position.	Vertical, Base Down
Overall Length.	11" ± 1/4"
Seated Length.	10-1/4" ± 1/4"
Greatest Radius.	2-13/16"
Bulb	ST-30
Caps	No. 3917
Base	Super-Jumbo 4-Pin, with Bayonet

Maximum Ratings, Absolute Values:

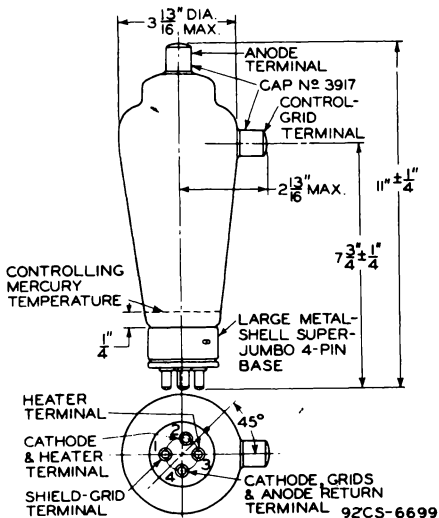
	<u>Continuous Service</u>	<u>Intermittent Service</u>		
PEAK FORWARD ANODE VOLT.	2500	750	10000	max.volts
PEAK INVERSE ANODE VOLT.	2500	750	10000	max.volts
GRID-No.1 (CONT.GRID) VOLT.:				
Before Conduction. . .	-1000	-1000	-1000	max.volts
During Conduction. . .	-10	-10	-10	max.volts
GRID-No.2 (SH'LD GRID) VOLT.:				
Before Conduction. . .	-500	-500	-500	max.volts
During Conduction. . .	-10	-10	-10	max.volts
INSTANTANEOUS ANODE CUR.:				
Below 25 Cycles. . . .	12.8	5.0	8.0	max.amp
25 Cycles and Higher .	40	77	16	max.amp
AVERAGE ANODE CURRENT. .	6.4	2.5	4.0	max.amp
SURGE ANODE CUR., for				
0.1 sec., max.	400	400	160	max.amp
INSTANTANEOUS GRID-No.1 CUR.	1.0	1.0	1.0	max.amp
AVERAGE GRID-No.1 CUR. .	0.25	0.25	0.25	max.amp
INSTANTANEOUS GRID-No.2 CUR.	2.0	2.0	2.0	max.amp
AVERAGE GRID-No.2 CUR. .	0.5	0.5	0.5	max.amp
TIME OF AVERAGING CURRENT	15	5	15	max.sec
COND.-MERCURY TEMP. RANGE [▲]	40-80	30-95	25-50	°C

* Must be applied 5 minutes before anode voltage is applied.

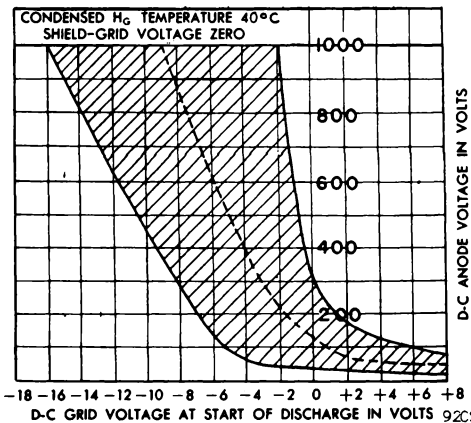
▲ Recommended condensed-mercury temperature = 40°C.



THYRATRON



OPERATIONAL REGION OF CRITICAL GRID VOLTAGE





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THYRATRON

METAL MERCURY-VAPOR TETRODE

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Electrical:	DATA				
	Continuous Service		Welder-Control Service		
Heater, for Unipotential Cathode:					
Voltage*.	5.0	5.0	5.0	5.5	volts
Current	10.0	10.0	10.0	11.0	amp
Direct Interelectrode Capacitance (Approx.):					
Grid No.1 to Anode	0.07	0.07	0.07	0.07	μuf
Peak Voltage Drop . .	16	16	16	16	volts
Approx. Control Characteristics:					
Anode Voltage . . .	100	2000	100	2000	volts
Grid-No.1 Voltage .	+1.0	-14	+1.0	-14	volts
Grid-No.2 Voltage .	0	0	0	0	volts
Ionization Time(Approx.)	10	10	10	10	μsec
Deionization Time (Approx.)	1000	1000	1000	1000	μsec
Mechanical:					
Mounting Position	Vertical, Radiator Down				
Overall Rigid Length.	10-11/16" ± 1/16"				
Greatest Radius	2-5/8"				
Terminals	See Outline Drawing				
Maximum Ratings, Absolute Values:					
	Continuous Service		Welder-Control Service		
PEAK FORWARD ANODE VOLT. .	2000 max.		750 max.		volts
PEAK INVERSE ANODE VOLT. .	2000 max.		750 max.		volts
GRID-No.1 (CONT. GRID) VOLT.:					
Before Conduction	-1000 max.		-1000 max.		volts
During Conduction	-10 max.		-10 max.		volts
GRID-No.2 (SHL'D GRID) VOLT.:					
Before Conduction	-300 max.		-300 max.		volts
During Conduction	-5.0 max.		-5.0 max.		volts
INSTANTANEOUS ANODE CUR.:					
Below 25 Cycles	13.0 max.		13.0 max.		amp
25 Cycles and Higher. . .	4.0 max.		7.7 max.		amp
AVERAGE ANODE CURRENT** . .	6.4 max.		2.5 max.		amp
SURGE ANODE CURRENT for					
0.1 sec. max.	400 max.		400 max.		amp
INSTANTANEOUS GRID-No.1 CUR.	1.0 max.		1.0 max.		amp
AVERAGE GRID-No.1 Cur.** .	0.25 max.		0.25 max.		amp
INSTANTANEOUS GRID-No.2 CUR.	2.0 max.		2.0 max.		amp
AVERAGE GRID-No.2 CUR.**. .	0.5 max.		0.5 max.		amp
COND.-MERCURY TEMP. RANGE▲	40 - 80		30 - 95		°C
* Must be applied at least 5 minutes before anode voltage is applied.					
** Averaged over any 15-second interval.					
▲ Recommended condensed-mercury temperature 40°C.					

MAY 1, 1946

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RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

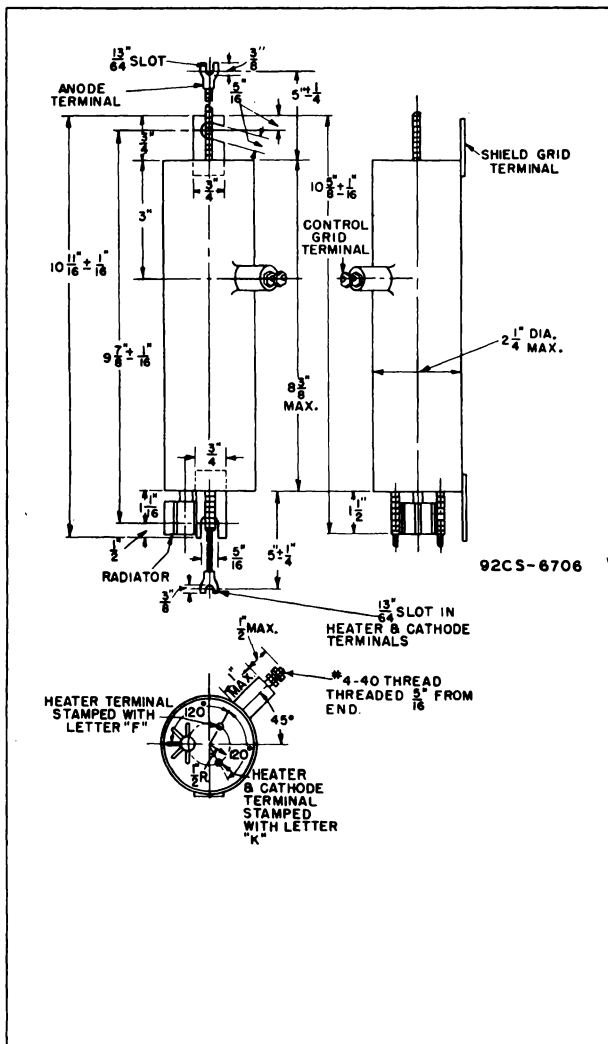
TENTATIVE DATA

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THYRATRON



MAY 1, 1946

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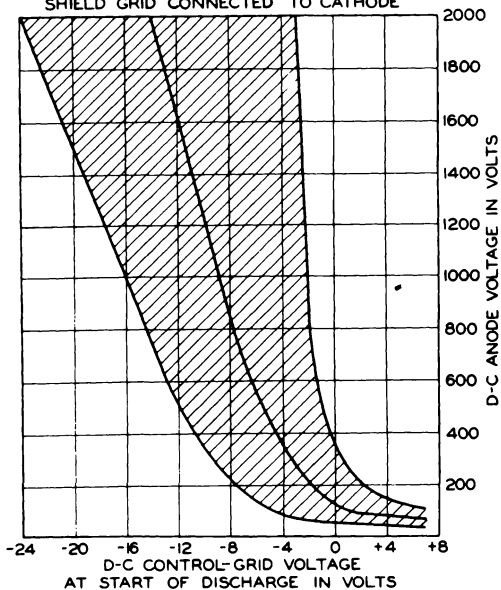


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THYRATRON

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TYPICAL CONTROL CHARACTERISTIC
SHADED AREA SHOWS RANGE OF CHARACTERISTIC
CONDENSED-MERCURY TEMP. 40°C
SHIELD GRID CONNECTED TO CATHODE



92CS-6698



502-A

502-A GAS THYRATRON

NEGATIVE-CONTROL TETRODE TYPE WITH METAL SHELL

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

	Min.	Av.	Max.	
Voltage.	5.7	6.3	7	ac or dc volts
Current at 6.3 volts	-	0.6	0.66	amp

Cathode:

Minimum heating time				
prior to tube conduction	10			sec

Direct Interelectrode Capacitances:

Grid No.1 to anode	0.2			μf
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Grid No.1 to cathode & shell, grid				
------------------------------------	--	--	--	--

No.2, and heater	2.5			μf
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Ionization Time (Approx.)	0.5			μsec
-------------------------------------	-----	--	--	-----------------

Deionization Time (Approx.):

For conditions: dc anode ma = 100, grid-No.1-circuit resistor (ohms) = 1000, and dc grid-No.1 supply volts = -250	10			μsec
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For conditions: dc anode ma = 100, grid-No.1-circuit resistor (ohms) = 1000, and dc grid-No.1 supply volts = -15	150			μsec
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Maximum Critical Grid-No.1 Current:

For conditions: anode volts (rms) = 460, and dc grid-No.1 volts ad- justed to cutoff	2			μamp
--	---	--	--	-----------------

Anode Voltage Drop	8			volts
------------------------------	---	--	--	-------

Mechanical:

Mounting Position	Any			
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Maximum Overall Length	2-5/8"			
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Seated Length	1-31/32" $\pm$ 3/32"			
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Maximum Diameter	1-5/16"			
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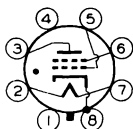
Weight (Approx.)	2 oz			
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Bulb	Metal Shell MT8G			
----------------	------------------	--	--	--

Base	Small-Wafer Octal 8-Pin (JETEC No.88-21)			
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BOTTOM VIEW

- Pin 1 - No Connection
Pin 2 - Heater
Pin 3 - Anode
Pin 4 - No Connection



- Pin 5 - Grid No.1
Pin 6 - Grid No.2
Pin 7 - Heater
Pin 8 - Cathode,
Shell

RELAY and GRID-CONTROLLED RECTIFIER SERVICE

Maximum Ratings, Absolute Values:

PEAK ANODE VOLTAGE:

Forward	180 max.	650 max.	volts
Inverse	360 max.	1300 max.	volts

← Indicates a change.

MAY 1, 1955

TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA

502-A



502-A GAS THYRATRON

GRID-No.2 (SHIELD-GRID)			
VOLTAGE:			
Peak, before tube			
conduction	-100 max.	-100 max.	volts
Average [■] , during tube			
conduction	-5 max.	-5 max.	volts
GRID-No.1 (CONTROL-GRID)			
VOLTAGE:			
Peak, before tube			
conduction	-250 max.	-250 max.	volts
Average [■] , during tube			
conduction	-10 max.	-10 max.	volts
CATHODE CURRENT:			
Peak	1.0 max.	1.0 max.	amp
Average [●]	0.2 max.	0.1 max.	amp
Fault, for duration of			
0.1 second max.	10 max.	10 max.	amp
GRID-No.2 CURRENT:			
Average [■]	+0.01 max.	+0.01 max.	amp
GRID-No.1 CURRENT:			
Average [■]	+0.01 max.	+0.01 max.	amp
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with			
respect to cathode . . .	100 max.	100 max.	volts
Heater positive with			
respect to cathode . . .	25 max.	25 max.	volts
AMBIENT-TEMPERATURE RANGE. .	-55 to +90	-55 to +90	°C

■ Averaged over 1 cycle.

● Averaged over any interval of 30 seconds maximum.

For Dimensional Outline, see GENERAL SECTION

MAY 1, 1955

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RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA

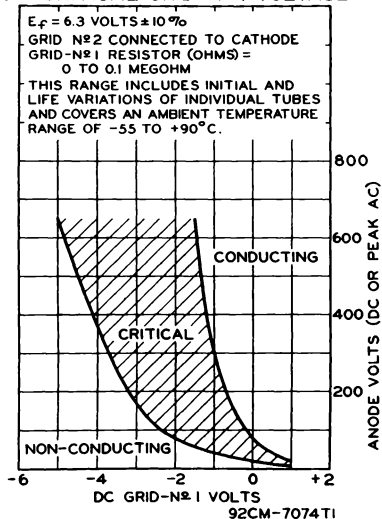


502-A

GAS THYRATRON

502-A

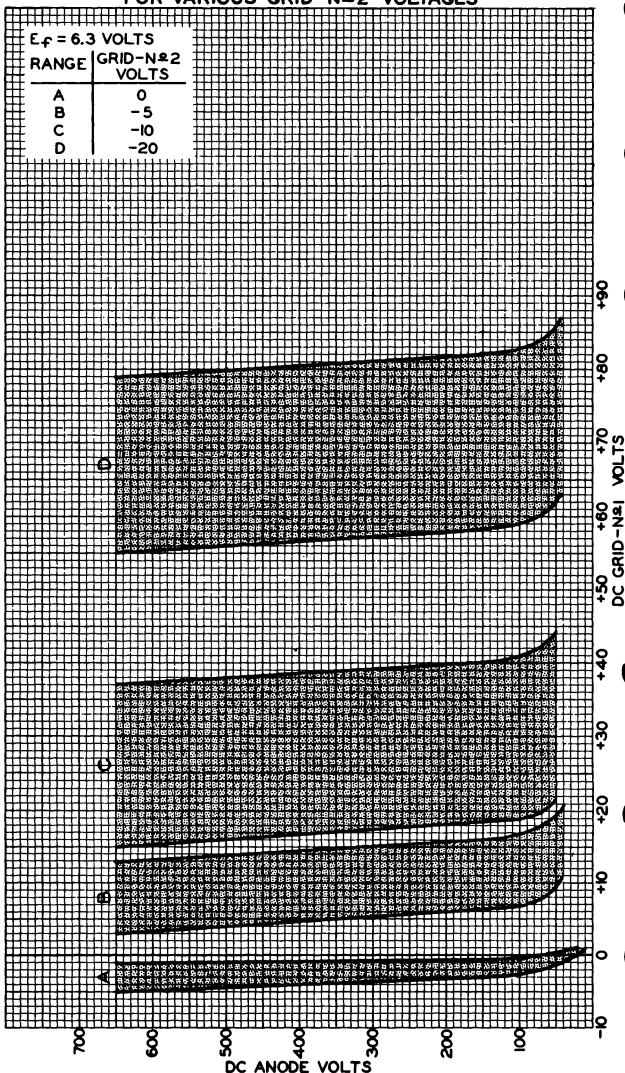
OPERATIONAL RANGE OF CRITICAL GRID-N^o1 VOLTAGE



502-A



502-A OPERATIONAL RANGES OF CRITICAL GRID-N₂1 VOLTAGE FOR VARIOUS GRID-N₂2 VOLTAGES



APRIL 26, 1955

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

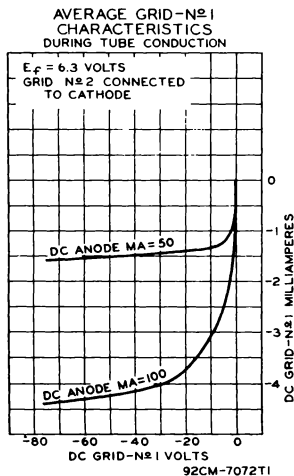
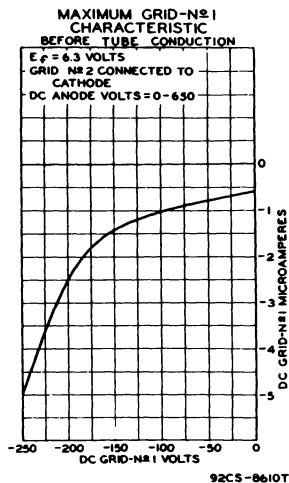
92CM-8607



502-A

502-A

CHARACTERISTIC CURVES



MAY 1, 1955

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEYCE-8610T
-7072T1



629

THYRATRON

GAS-TRIODE

629

DATA**Electrical:****Heater, for Unipotential Cathode:**

Voltage*	2.5	volts
Current.	2.6	amp

Direct Interelectrode Capacitances (Approx.):

Grid to Anode.	3.3	μmf
Grid to Cathode.	3.3	μmf
Anode to Cathode	1.8	μmf

Peak Voltage Drop.	15	volts
--------------------	----	-------

Control Characteristic . Negative

Ionization Time (Approx.)	10	$\mu\text{seconds}$
---------------------------	----	---------------------

Deionization Time (Approx.)	1000	$\mu\text{seconds}$
-----------------------------	------	---------------------

Mechanical:

Mounting Position.	Any
--------------------	-----

Maximum Overall Length	4-1/4"
------------------------	--------

Maximum Seated Length.	3-5/8"
------------------------	--------

Maximum Diameter	1-9/16"
------------------	---------

Bulb	ST-12
------	-------

Base	Small 5-Pin
------	-------------

Maximum Ratings, Absolute Values:

PEAK FORWARD ANODE VOLTAGE	350 max.	volts
----------------------------	----------	-------

PEAK INVERSE ANODE VOLTAGE	350 max.	volts
----------------------------	----------	-------

PEAK GRID VOLTAGE.	-90 max.	volts
--------------------	----------	-------

PEAK ANODE CURRENT	0.2 max.	amp
--------------------	----------	-----

AVERAGE ANODE CURRENT**	0.04 max.	amp
-------------------------	-----------	-----

SURGE ANODE CURRENT for 0.1 sec. max.	2.0 max.	amp
---------------------------------------	----------	-----

GRID CURRENT, Before Conduction	2.5 max.	μamp
---------------------------------	----------	-----------------

PEAK GRID CURRENT.	20 max.	ma.
--------------------	---------	-----

AVERAGE GRID CURRENT**	0.4 max.	ma.
------------------------	----------	-----

DC HEATER-CATHODE POTENTIAL RANGE	-45 to +5	volts
-----------------------------------	-----------	-------

AMBIENT TEMPERATURE RANGE	-40 to +70	$^{\circ}\text{C}$
---------------------------	------------	--------------------

* Heater voltage must be applied at least 30 seconds before start of tube conduction.

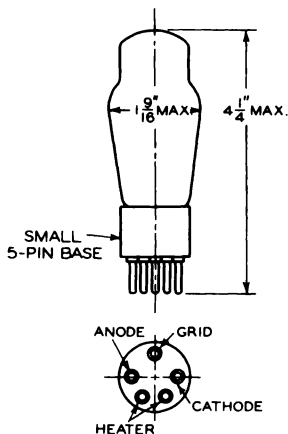
** Averaged over any 10-second interval.

629



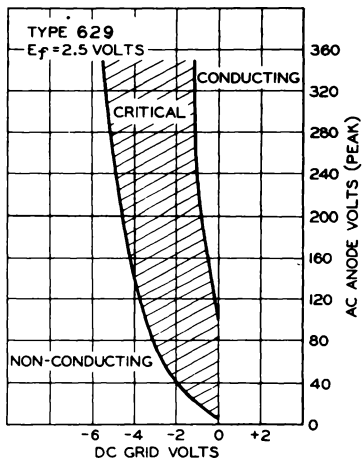
629

THYRATRON



92CS-6737

OPERATIONAL REGION OF CRITICAL GRID VOLTAGE



92CS-6736

MAY 1, 1946

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-6737-6736



672

THYRATRON

MERCURY-VAPOR TETRODE

672

Electrical:DATA**Heater, for Unipotential Cathode:**

Voltage* 5.0 volts
 Current. 6 amp

Direct Interelectrode Capacitances, (Approx.):

Grid No.1 to Anode 0.04 μ f
 Grid No.2 to Anode 3 μ f

Peak Voltage Drop. 12 volts

Control Characteristic Negative

Ionization Time (Approx.). 10 μ seconds

Deionization Time (Approx.) 1000 μ seconds

Mechanical:

Mounting Position. Vertical, Base Down

Overall Length 8-1/8" $\pm$ 1/4"

Maximum Diameter 2-5/16"

Bulb T-18

Cap. No.3995

Base Large Shell Super-Jumbo 4-Pin

Maximum Ratings, Absolute Values:

For frequencies up to 150 cycles

PEAK FORWARD ANODE VOLTAGE 1500 max. volts

PEAK INVERSE ANODE VOLTAGE 1500 max. volts

PEAK GRID-No.1 (CONTROL-GRID) VOLT.:

Before Conduction. -1000 max. volts

PEAK GRID-No.2 (SHIELD-GRID)VOLTAGE:

Before Conduction. -300 max. volts

PEAK ANODE CURRENT 30 max. amp

AVERAGE ANODE CURRENT** 2.5 max. amp

SURGE ANODE CURRENT for 0.1 sec., max. 150 max. amp

GRID-No.1 CURRENT, Before Conduction(Grid Neg) 2 max. μ amp

PEAK GRID-No.1 CURRENT 1.0 max. amp

AVERAGE GRID-No.1 CURRENT**. 0.25 max. amp

PEAK GRID-No.2 CURRENT 1.0 max. amp

AVERAGE GRID-No.2 CURRENT**. 0.25 max. amp

COND.-MERCURY TEMPERATURE RANGE Δ 40-80 $^{\circ}$ C

* Heater voltage must be applied at least 5 minutes before anode voltage is applied.

** Averaged over any 15-second interval.

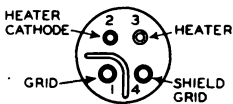
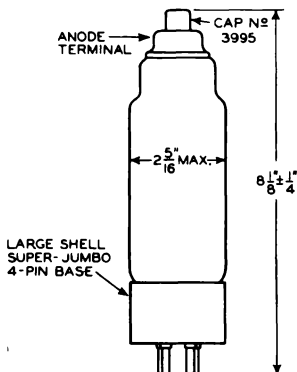
Δ Recommended Condensed-Mercury Temperature 45-50 $^{\circ}$ C.

672



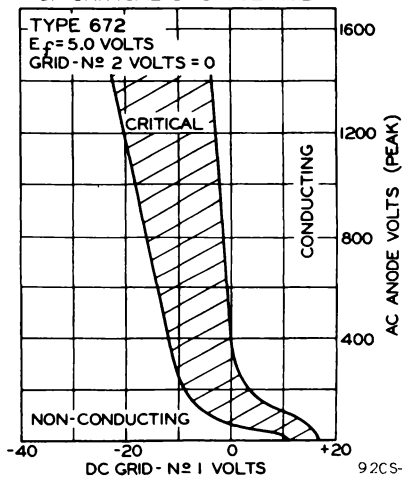
672

THYRATRON



92CS-6735

OPERATIONAL REGION OF CRITICAL GRID VOLTAGE



92CS-6734

MAY 1, 1946

TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-6735-5734



672-A

THYRATRON

MERCURY-VAPOR TETRODE

Supersedes Type 672

672-A

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathode:

Voltage. 5 ac or dc volts

Current. 5 amp

Cathode:

Min. Heating Time, prior to tube conduction. . . 5 minutes

Direct Interelectrode Capacitances:

Grid No.1 to Anode 0.04 μ fGrid No.2 to Anode 3 μ fIonization Time (Approx.). 10 μ secDeionization Time (Approx.). 1000 μ secMaximum Critical Grid Current. 2 μ amp

Anode Voltage Drop (Approx.) 12 volts

Mechanical:

Mounting Position. Vertical, Base Down

Overall Length 7-7/8" $\pm$ 1/4"Seated Length. 7-1/8" $\pm$ 1/4"

Maximum Diameter 2-5/16"

Bulb T-18

Cap. Skirted Medium

Base Large-Shell Super-Jumbo 4-Pin, Bayonet

Basing Designation for BOTTOM VIEW 4CE

Pin 1-Grid No.1

Pin 2-Heater,
Cathode

Pin 3-Heater

Pin 4-Grid No.2

Cap - Anode

GRID-CONTROLLED RECTIFIER SERVICE.*For frequencies up to 150 cycles***Maximum Ratings, Absolute Values:**

PEAK ANODE VOLTAGE:

Forward. 2500 max. volts

Inverse. 2500 max. volts

GRID-No.2 (SHIELD-GRID) VOLTAGE:

Peak, before anode conduction. -300 max. volts

GRID-No.1 (CONTROL-GRID) VOLTAGE:

Peak, before anode conduction. -1000 max. volts

CATHODE CURRENT:

Peak 40 max. amp

Average[■] 3.2 max. amp

Surge, for duration of 0.1 sec. max. . . 150 max. amp

[■] See next page.

(continued on next page)

JUNE 1, 1948

TUBE DEPARTMENT

TENTATIVE DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

672-A



672-A THYRATRON

GRID-No.2 CURRENT:

Peak	1 max.	amp
Average ■	0.25 max.	amp

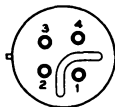
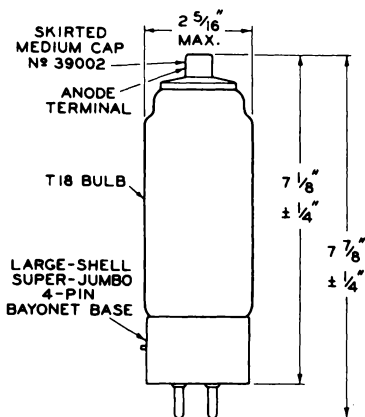
GRID-No.1 CURRENT:

Peak	1 max.	amp
Average ■	0.25 max.	amp

COND.-MERCURY TEMPERATURE RANGE ▲	40 to 80	°C
---	----------	----

■ Averaged over any interval of 15 sec. max.

▲ Recommended condensed-mercury temperature is between 45° and 50°C.



BOTTOM VIEW OF BASE

92CS-6735R1

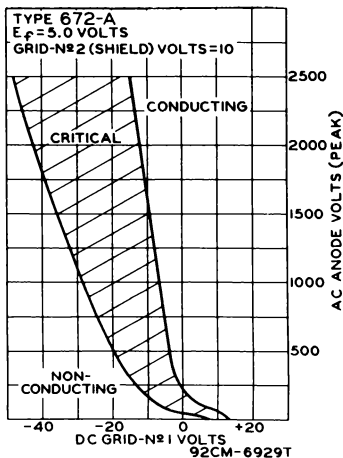
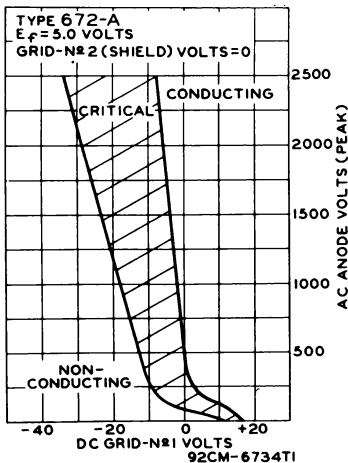


672-A

THYRATRON

672-A

OPERATIONAL RANGES OF CRITICAL GRID-N₂1 VOLTAGE





676

THYRATRON

MERCURY-VAPOR TRIODE

676

Electrical:

DATA

Heater, for Unipotential Cathode:

Voltage*	5	volts
Current	10	amp

Direct Interelectrode Capacitance:

Grid to Anode (Approx.)	5	μf
Peak Voltage Drop	12	volts

Control Characteristic. . . Negative

Ionization Time (Approx.)	10	μseconds
---------------------------	----	----------

Deionization Time (Approx.)	1000	μseconds
-----------------------------	------	----------

Mechanical:

Mounting Position Vertical, Base Down

Overall Length. 11-1/4" ± 1/2"

Maximum Diameter. 3-13/16"

Bulb. ST-30

Cap No. 3985

Base. Large Shell Super-Jumbo 4-Pin

Maximum Ratings, Absolute Values:

For frequencies up to 150 cycles

	Continuous Service	Welder- Control Service	
PEAK FORWARD ANODE VOLTAGE	2500 max.	750 max.	volts
PEAK INVERSE ANODE VOLTAGE	2500 max.	750 max.	volts
PEAK GRID VOLTAGE:			
Before Conduction	-500 max.	-500 max.	volts
PEAK ANODE CURRENT.	40 max.	77 max.	amp
AVERAGE ANODE CURRENT . . .	6.4 max.	2.5 max.	amp
SURGE ANODE CURRENT for			
0.1 sec. max.	200 max.	200 max.	amp
GRID CURRENT: Before con-			
duction (Grid Negative)	5 max.	5 max.	μamp
PEAK GRID CURRENT	1 max.	1 max.	amp
AVERAGE GRID CURRENT. . . .	0.25 max.	0.25 max.	amp
TIME OF AVERAGING CURRENTS.	15 max.	5 max.	sec
COND.-MERCURY TEMP. RANGE [▲]	40 - 80	40 - 90	°C

* Heater voltage must be applied for at least 5 minutes before anode voltage is applied.

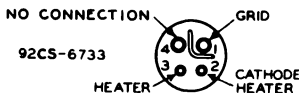
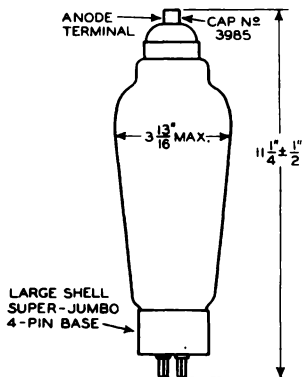
▲ Recommended condensed-mercury temperature range, 45 - 55°C.

676

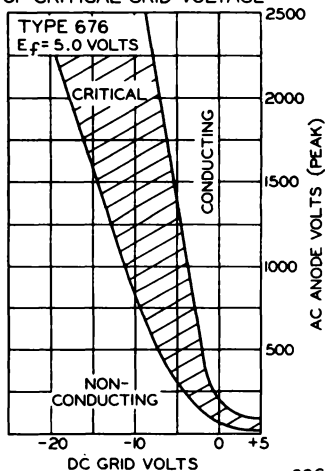


676

THYRATRON



OPERATIONAL REGION OF CRITICAL GRID VOLTAGE



92CS-6732

MAY 1, 1946

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-6733-6732



677

THYRATRON

MERCURY-VAPOR TRIODE

677

Electrical:DATA

Heater, for Unipotential Cathode:

Voltage* 5 volts

Current 10 amp

Direct Interelectrode Capacitance:

Grid to Anode (Approx.) 5 μ f

Peak Voltage Drop 12 volts

Control Characteristic: Negative

Ionization Time (Approx.) 10 μ secondsDeionization Time (Approx.) 1000 μ seconds**Mechanical:**

Mounting Position Vertical, Base Down

Overall Length 11-1/4" $\pm$ 1/2"

Maximum Diameter 3-13/16"

Bulb ST-30

Cap No. 3985

Base Large Shell Super-Jumbo 4-Pin

Maximum Ratings, Absolute Values:

For frequencies up to 150 cycles

PEAK FORWARD ANODE VOLTAGE 10000 max. volts

PEAK INVERSE ANODE VOLTAGE 10000 max. volts

PEAK GRID VOLTAGE:

Before Conduction -500 max. volts

Anode Negative 10 max. volts

PEAK ANODE CURRENT 15 max. amp

AVERAGE ANODE CURRENT** 4 max. amp

SURGE ANODE CURRENT for 0.1 sec., max. 16 max. amp

GRID CURRENT: Before Conduction (Grid Neg.) 5 max. μ amp

PEAK GRID CURRENT 1 max. amp

AVERAGE GRID CURRENT** 0.25 max. amp

COND.-MERCURY TEMPERATURE RANGE[▲] 30 - 50 °C

* Heater voltage must be applied for at least 5 minutes before anode voltage is applied.

** Averaged over any 15-second interval.

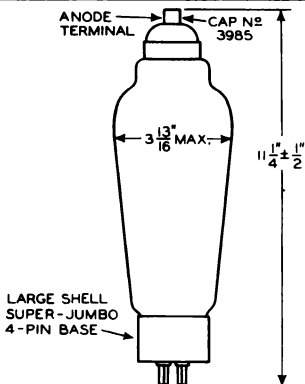
▲ Recommended condensed-mercury temp. range, 35 - 45°C.

677

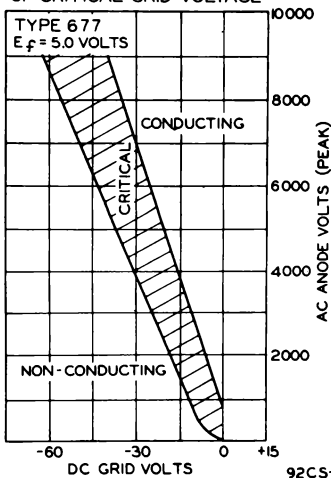


677

THYRATRON



OPERATIONAL REGION OF CRITICAL GRID VOLTAGE



MAY 1, 1946

 TUBE DIVISION
 RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-6731-6730



884, 885 THYATRONS

TRIODE TYPES

For new equipment design, RCA-884 is recommended.

884
885
884

GENERAL DATA

Electrical:

	Type 884	Type 885	
Heater.	Coated Unipotential Cathode		
Voltage	$6.3 \pm 10\%$	$2.5 \pm 10\%$	a-c ord-c volts
Current	0.6	1.5	amp. ←
Direct Interelectrode Capacitances:			←
Grid to Anode . . .	6	6	μuf
Grid to Cathode . .	2	2	μuf
Anode to Cathode . .	0.6	0.6	μuf
Tube Voltage Drop . .	16	16	approx. volts

Physical:

Mounting Position . .	Any	Any	
Maximum Overall Length	4-1/8	4-3/16	inches
Maximum Seated Length	3-9/16	3-9/16	inches
Maximum Diameter. . .	1-9/16	1-9/16	inches
Bulb.	ST-12	ST-12	

Base.	{ Small Shell Octal 6-Pin	{ Small 5-Pin
---------------	------------------------------	------------------

Basing Designation G-6Q2 5A2

Pin 1—No Connection

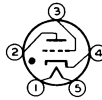
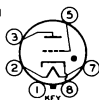
Pin 2—Heater

Pin 3—Anode

Pin 5—Grid

Pin 7—Heater

Pin 8—Cathode



Pin 1—Heater

Pin 2—Anode

Pin 3—Grid

Pin 4—Cathode

Pin 5—Heater

BOTTOM VIEWS

RELAXATION OSCILLATOR — Sweep-Circuit Service^Δ

Maximum Ratings, Absolute Values:

PEAK ANODE VOLTAGE.	300 max.	volts
PEAK CATHODE CURRENT •	300 max.	ma. ←
PEAK GRID CURRENT ▲	1 max.	ma. ←
PEAK VOLTAGE BETWEEN ANY TWO ELECTRODES		
OR BETWEEN ANY ELECTRODE AND HEATER . .	350 max.	volts
D-C HEATER-CATHODE POTENTIAL.	-100 to +25	volts ←
AMBIENT TEMPERATURE RANGE	-75 to +90	°C ←

Δ For best life results, it is desirable to delay tube conduction for about 10 seconds after applying heater voltage in order to allow the cathode to reach normal operating temperature.

• In sweep circuits designed so that the peak cathode current of 300 milliamperes will not be exceeded during condenser discharge, the resultant average cathode current is so small in comparison with the average-current capability of the cathode that a maximum rating for average cathode current is omitted because it has no practical significance.

▲ The resistance of the grid resistor should be not less than 1000 ohms per maximum instantaneous volt applied to the grid. Resistance values in excess of 500000 ohms may cause circuit instability.

← Indicates a change.

884
885



884,885

THYRATRONS

(continued from preceding page)

RELAY & GRID-CONTROLLED RECTIFIER SERVICE [□]

At Frequencies Below 75 Cycles per Second

Maximum Ratings, Absolute Values:

PEAK ANODE VOLTAGE.	350 max.	volts
PEAK CATHODE CURRENT.	300 max.	ma.
AVERAGE CATHODE CURRENT #	75 max.	ma.
PEAK VOLTAGE BETWEEN ANY TWO ELECTRODES OR BETWEEN ANY ELECTRODE AND HEATER	350 max.	volts
→ D-C HEATER-CATHODE POTENTIAL.	-100 to +25	volts
→ AMBIENT TEMPERATURE RANGE	-75 to +90	°C

[□] The heater voltage should be applied for 10 seconds before tube conduction occurs.

For an averaging period of 30 seconds.

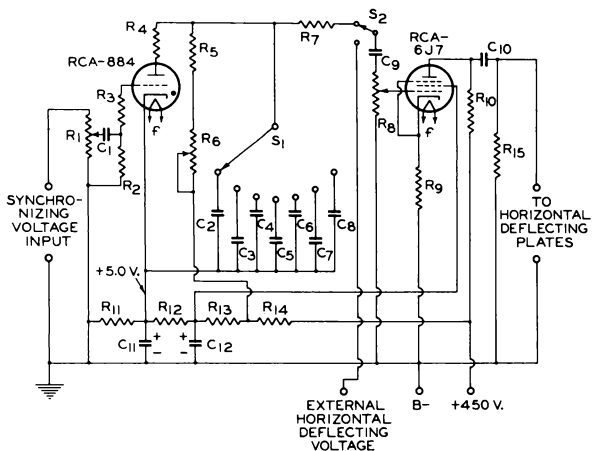
← Indicates a change.



884

884

LINEAR SWEEP-CIRCUIT OSCILLATOR AND AMPLIFIER



$C_1 = 0.25 \mu\text{F}$ OR GREATER

$C_2 = 0.25 \mu\text{F}$, 500 V.

$C_3 = 0.1 \mu\text{F}$, 500 V.

$C_4 = 0.04 \mu\text{F}$, 500 V.

$C_5 = 0.015 \mu\text{F}$, 500 V.

$C_6 = 0.005 \mu\text{F}$, 500 V.

$C_7 = 0.002 \mu\text{F}$, 500 V.

$C_8 = 0.0008 \mu\text{F}$, 500 V.

$C_9 = 0.5 \mu\text{F}$, 250 V.

$C_{10} = 0.5 \mu\text{F}$, 500 V.

$C_{11} = 25 \mu\text{F}$, 15 V.

$C_{12} = 8 \mu\text{F}$, 200 V.

$R_1 = 5000 \text{ OHM (MAX.) POTENTIOMETER}$

$R_2 = \text{NOT GREATER THAN } 50000 \text{ OHMS}$

$R_3 = 2000-3000 \text{ OHMS, } 0.5 \text{ WATT}$

$R_4 = 350-500 \text{ OHMS, } 0.5 \text{ WATT}$

$R_5 = 0.3-0.5 \text{ MEGOHM, } 0.5 \text{ WATT}$

$R_6 = 1 \text{ MEGOHM POTENTIOMETER}$

$R_7 = 1 \text{ MEGOHM, } 0.5 \text{ WATT}$

$R_8 = 0.5 \text{ MEGOHM POTENTIOMETER}$

$R_9 = 850 \text{ OHMS, } 0.5 \text{ WATT}$

$R_{10} = 0.1 \text{ MEGOHM, } 0.5 \text{ WATT}$

$R_{11} = 1500 \text{ OHMS, } 0.5 \text{ WATT}$

$R_{12} = 25000 \text{ OHMS, } 1.0 \text{ WATT}$

$R_{13} = 60000 \text{ OHMS, } 1.0 \text{ WATT}$

$R_{14} = 60000 \text{ OHMS, } 1.0 \text{ WATT}$

$R_{15} = 2.0 \text{ MEGOHMS, } 1.0 \text{ WATT}$

$S_1 = 7\text{-CONTACT S.P. SWITCH}$

$S_2 = \text{S.P.D.T. SWITCH}$

92CM-4875R1

APPROXIMATE FREQUENCY RANGE (CYCLES/SEC.)

SWITCH (S_1) ON		C_2	C_3	C_4	C_5	C_6	C_7	C_8
R_6 AT	MAX.	20	40	110	280	670	1500	3600
	MIN.	60	130	340	880	2200	4900	11400

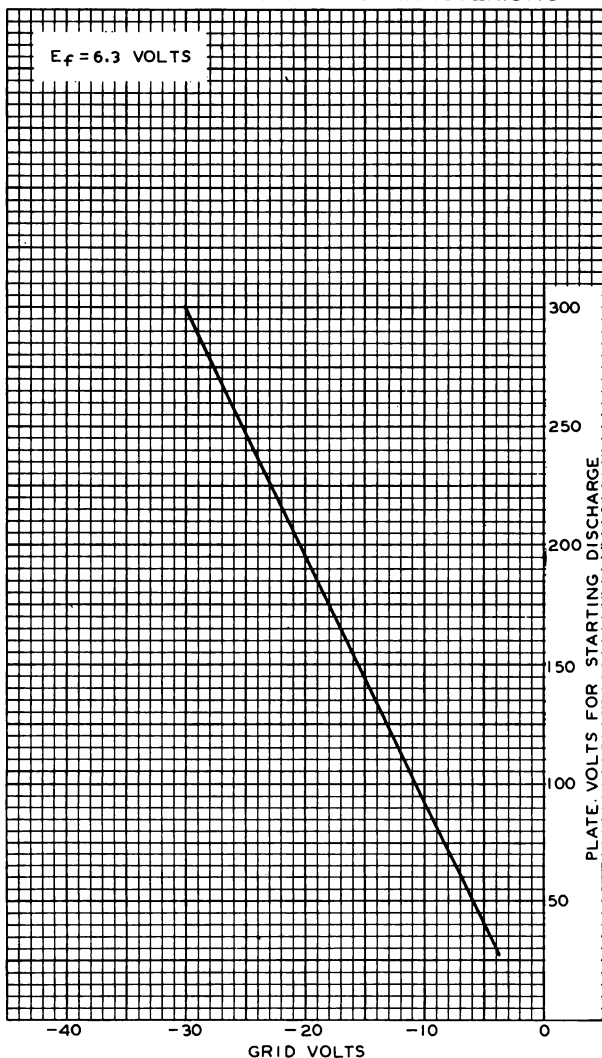
The license extended to the purchaser of tubes appears in the License Notice accompanying them. Information contained herein is furnished without assuming any obligations. ← Indicates a change.

884



884

AVERAGE CONTROL CHARACTERISTIC



JAN. 4, 1945

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA HARRISON, NEW JERSEY

92CM-4883 R I



2050

THYRATRON

GAS TETRODE

2050

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:	<u>Min.</u>	<u>Av.</u>	<u>Max.</u>	
Voltage (AC or DC)	5.7	6.3	6.9	volts
Current, with heater volts = 6.3	0.54	0.60	0.66	amp

Cathode:

Heating Time, prior to tube conduction	10	-	-	sec
---	----	---	---	-----

Direct Interelectrode Capacitances (Approx.):*

Grid No.1 to Anode		0.26	μf
Input		4.2	μf
Output		3.6	μf

Ionization Time (Approx.):

For conditions: dc anode volts = 100; grid-No.1 square-pulse volts = 50; and peak anode amp. during conduction = 1.0	0.5	μsec
--	-----	-----------------

Deionization Time (Approx.):

For conditions: dc anode volts = 125; grid-No.1 volts = -250; grid-No.1 resistor (ohms) = 1000; dc anode amp. = 0.1	50	μsec
---	----	-----------------

For conditions: dc anode volts = 125; grid-No.1 volts = -10; grid-No.1 resistor (ohms) = 1000; dc anode amp. = 0.1	100	μsec
--	-----	-----------------

Maximum Critical Grid Current, with ac anode-
supply volts (rms) = 460, and average anode
amp. = 0.1

0.5 μamp
8 volts

Tube Voltage Drop (Approx.)

Grid-No.1 Control Ratio (Approx.) with grid-No.1
resistor (megohms) = 0; grid-No.2 volts = 0

250

Grid-No.2 Control Ratio (Approx.) with grid-No.1
resistor (megohms) = 0; grid-No.2 resistor
(megohms) = 0; grid-No.1 volts = 0

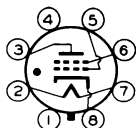
800

* Without external shield.

Mechanical:

Mounting Position	Any
Maximum Overall Length	4-1/8"
Maximum Seated Length	3-9/16"
Maximum Diameter	1-9/16"
Bulb	ST-12
Base	Small-Shell Octal 8-Pin
Basing Designation for BOTTOM VIEW	6BS

Pin 1-No Connection
Pin 2-Heater
Pin 3-Anode
Pin 4-No Connection



Pin 5-Grid No.1
Pin 6-Grid No.2
Pin 7-Heater
Pin 8-Cathode

← Indicates a change.

JUNE 15, 1948

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA

2050



2050 THYRATRON

RELAY and GRID-CONTROLLED RECTIFIER SERVICE

Maximum Ratings, Absolute Values:

PEAK ANODE VOLTAGE:

Forward.	180 max.	650 max.	volts
Inverse.	360 max.	1300 max.	volts

GRID-No.2 (SHIELD-GRID) VOLTAGE:

Peak, before anode conduction.	-100 max.	-100 max.	volts
Average, during anode conduction [■]	-10 max.	-10 max.	volts

GRID-No.1 (CONTROL-GRID) VOLTAGE:

Peak, before anode conduction.	-250 max.	-250 max.	volts
Average, during anode conduction [■]	-10 max.	-10 max.	volts

CATHODE CURRENT:

Peak	1.0 max.	1.0 max.	amp
Average [■]	0.2 max.	0.1 max.	amp
Surge, for duration of 0.1 sec. max.	10 max.	10 max.	amp

→ GRID-No.2 CURRENT:

Average [■]	+0.01 max.	+0.01 max.	amp
--------------------------------	------------	------------	-----

→ GRID-No.1 CURRENT:

Average [■]	+0.01 max.	+0.01 max.	amp
--------------------------------	------------	------------	-----

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode.	100 max.	100 max.	volts
Heater positive with respect to cathode.	25 max.	25 max.	volts

AMBIENT TEMPERATURE RANGE. . . -75 to +90 -75 to +90 °C

→ Typical Operating Conditions for Relay Service:

RMS Anode Voltage.	117 . .	400 . .	volts
Grid-No.2 Voltage.	0 . .	0 . .	volts
RMS Grid-No.1 Bias Voltage.	5 [□] . .	- . .	volts
DC Grid-No.1 Bias Voltage.	- . .	-6 . .	volts
Peak Grid-No.1 Signal Voltage.	5 . .	6 . .	volts
Grid-No.1-Circuit Resistance.	1.0 . .	1.0 . .	megohm
Anode-Circuit Resistance#.	1200 . .	2000 . .	ohms

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:

For average anode current below 0.1 amp.	10 max.	megohms
For average anode current above 0.1 amp.	2 max.	megohms

■ Averaged over any interval of 30 sec. max.

□ Approximately 180° out of phase with the anode voltage.

Sufficient resistance, including the tube load, must be used under any conditions of operation to prevent exceeding the current ratings.

→ indicates a change.



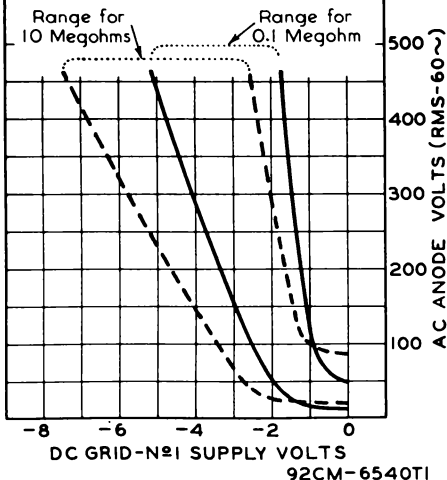
2050 THYRATRON

2050

OPERATIONAL RANGE OF CRITICAL GRID VOLTAGE

TYPE 2050 GRID-N₂ VOLTS=0

RANGES SHOWN ARE FOR TWO VALUES OF GRID RESISTOR - 0.1 MEG. AND 10 MEG. - AND TAKE INTO ACCOUNT INITIAL DIFFERENCES BETWEEN INDIVIDUAL TUBES & SUBSEQUENT DIFFERENCES DURING TUBE LIFE, FOR A HEATER-VOLTAGE RANGE OF 5.7 TO 6.9 VOLTS

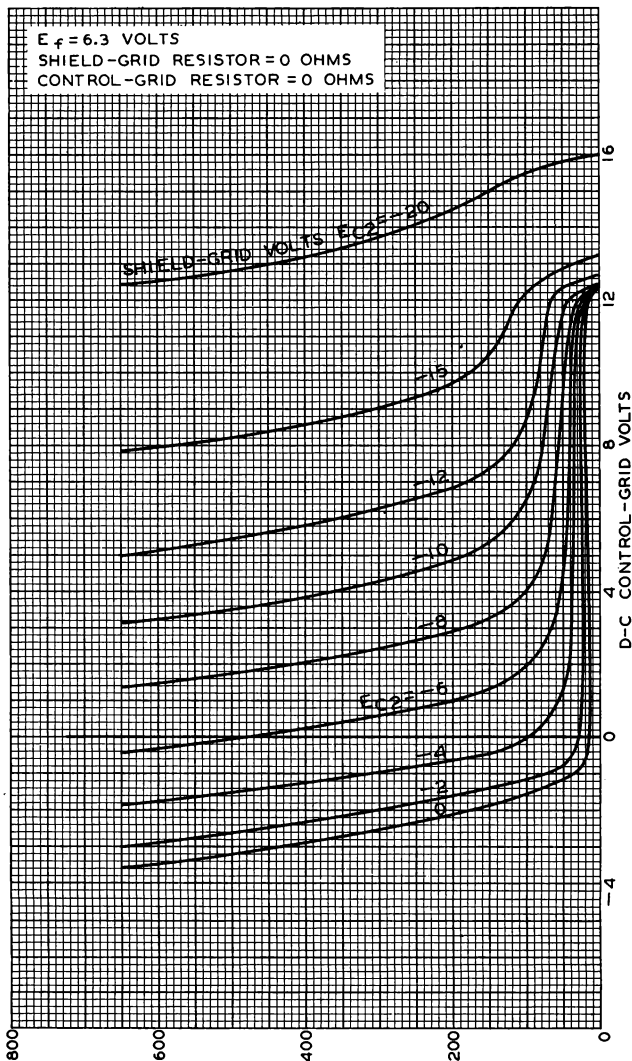




2050

2050

AVERAGE CONTROL CHARACTERISTICS



MAY 3, 1944

D-C ANODE VOLTS
RCA VICTOR DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6274R1

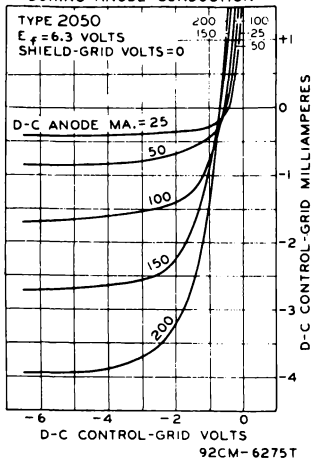
2050



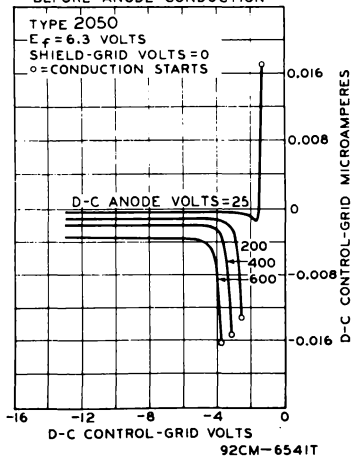
2050

THYRATRON

AVERAGE GRID CHARACTERISTICS
DURING ANODE CONDUCTION



AVERAGE GRID CHARACTERISTICS
BEFORE ANODE CONDUCTION



APRIL 1, 1944

RCA VICTOR DIVISION
 RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6275T
 92CM-6541T



5550

IGNITRON

SIZE A

5550

DATA**General:**

Peak Voltage Drop (Approx.) 12 volts
 Cooling:
 Type Air, or Water-Cooled Clamp
 Clamp Width (Approx.) 1-3/4"
 Clamp Location See Outline Drawing
 Mounting Position Vertical, Flexible Lead Up
 Max. Rigid Length (Approx.) 10"
 Maximum Diameter 2-3/4"

AC WELDER-CONTROL SERVICE*

Ratings are for any voltage from 250 to 600 volts rms
at frequencies from 25 to 60 cycles

Maximum Ratings, Absolute Values:

	Air Cooled*	Water Cooled	
DEMAND	105 max.	300 max.	kva
CORRESPONDING AVERAGE ANODE CUR.	3 max.	12.1 max.	amp
AVERAGE ANODE CURRENT	5.6 max.	22.4 max.	amp
CORRESPONDING DEMAND	35 max.	100 max.	kva
TIME OF AVERAGING ANODE CURRENT:			
AT 500 VOLTS RMS	15.5 max.	11 max.	sec
AT 250 VOLTS RMS	31 max.	22 max.	sec
SURGE ANODE CURRENT	■	■ peak	amp
PEAK POSITIVE IGNITOR VOLTAGE§ {	900 max.	900 max.	volts
	200 min.	200 min.	volts
PEAK NEGATIVE IGNITOR VOLTAGE {	5 max.	5 max.	volts
PEAK IGNITOR CURRENT § {	100 max.	100 max.	amp
	30 min.	30 min.	amp
AVERAGE IGNITOR CURRENT** . .	1 max.	1 max.	amp
IGNITION TIME§	100 max.	100 max.	μsec
COOLING CLAMP TEMPERATURE . .	75 max.	50 max.	°C

* Mercury condensation in the anode-seal must be prevented by suitable heating devices.

• RMS demand-voltage, -current, and -kva are on the basis of full-cycle conduction (no phase delay) regardless of whether or not phase control is used. Use the 250-volt rating for voltages below 250 volts.

** Averaged over any 5-second interval.

■ Must be limited to 280% of maximum rms demand current.

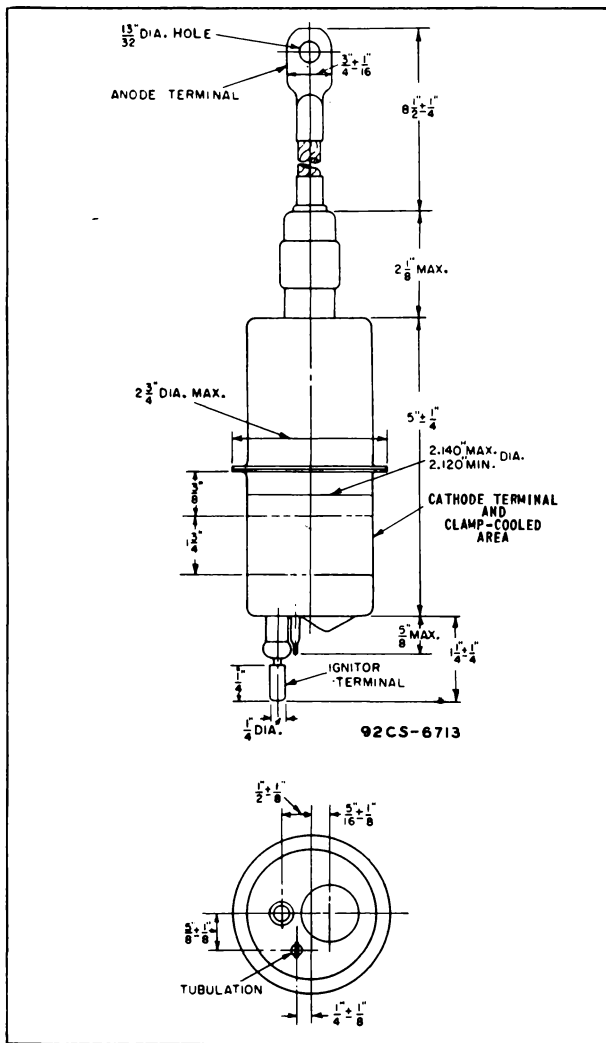
§ Ignition will occur if either minimum peak positive potential is applied, or minimum peak ignitor current flows, for the rated maximum ignitor ignition time.

5550



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IGNITRON



MAY 1, 1946

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

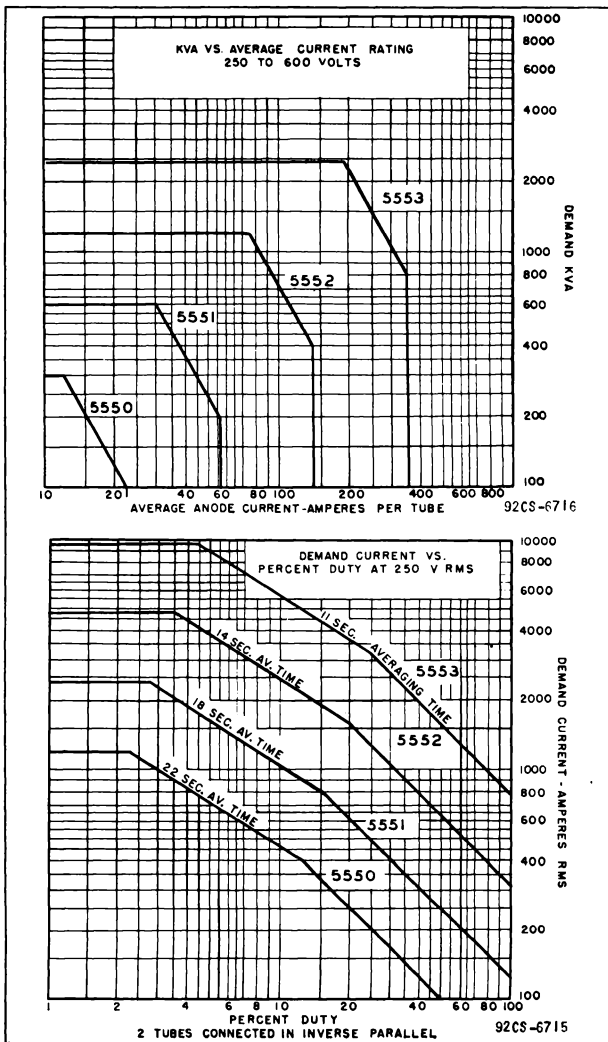
CE-6713



5550

IGNITRON

5550



MAY 1, 1946

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

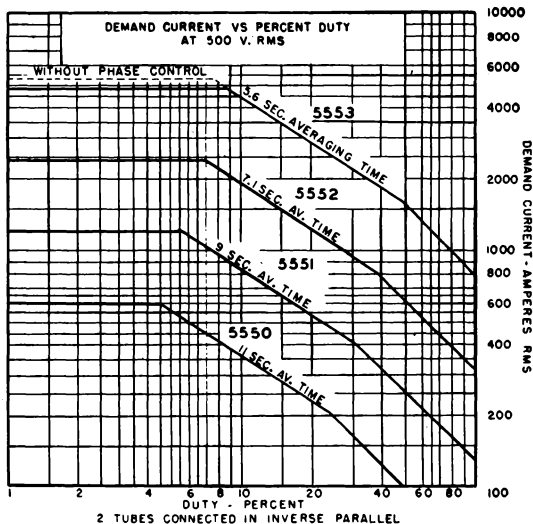
CE-6716-6715

5550



5550

IGNITRON



92CS-6714



555I-A

555I-A IGNITRON

WATER-COOLED, STEEL-JACKETED, MERCURY-POOL-CATHODE
TYPE HAVING MOUNTING PLATE FOR THERMOSTATIC CONTROL

For resistance-welding control

GENERAL DATA

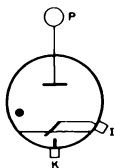
Electrical:

Cathode Excitation.			Cyclic
Cathode-Spot Starting.			By Ignitor
Minimum Requirements for Cathode Excitation:			
Peak ignitor voltage required to fire.	200	volts	
Peak ignitor current required to fire.	30	amp	
Starting time at required voltage or current.	100	μsec	
Tube Voltage Drop:			
At peak anode current of 3400 amperes.	26	volts	
At peak anode current of 176 amperes.	13	volts	

Mechanical:

Operating Position.	Vertical, flexible lead up
Maximum Overall Length (Including flexible lead).	23-1/4"
Maximum Radius (Including water connections).	2-7/8"
Weight.	3.6 lbs
Terminal Connections (<i>See Dimensional Outline</i>):	

P - Anode
Terminal
(Flexible
lead)
K - Cathode
Terminal
(Bar oppo-
site anode
terminal)



I - Ignitor
Terminal
(Within
jacket
skirt at
cathode
end)

Cooling:

Type.			Water
Minimum inlet water temperature.	10	°C	
Maximum outlet water temperature.	40	°C	
Minimum water flow.	1	gpm	
Maximum water-temperature rise.	4	°C	
Maximum pressure drop.	2.5	psi	

INTERMITTENT RECTIFIER SERVICE and FREQUENCY-CHANGER WELDER SERVICE

Maximum Ratings, Absolute-Maximum Values:

*For zero phase-control angle and
frequencies from 50 to 60 cps*

RATING I

PEAK ANODE VOLTAGE:

Forward.	500 max.	volts
Inverse.	500 max.	volts

5551-A



5551-A

IGNITRON

ANODE CURRENT:

Peak	700 max.	amp
Average (Averaged over any interval of 6 seconds maximum).	40 max.	amp
Fault, for duration of 0.15 sec- ond maximum.	8750 max.	amp

RATING II**PEAK ANODE VOLTAGE:**

Forward.	1200 max.	1200 max.	volts
Inverse.	1200 max.	1200 max.	volts

ANODE CURRENT:

Peak	135 max.	600 max.	amp
Average (Averaged over any interval of 10 sec- onds maximum).	22.5 max.	5 max.	amp
Average (Averaged over any interval of 0.2 sec- ond maximum).	22.5 max.	100 max.	amp
Fault, for duration of 0.15 second maximum	7500 max.	7500 max.	amp

RATING III**PEAK ANODE VOLTAGE:**

Forward.	1500 max.	1500 max.	volts
Inverse.	1500 max.	1500 max.	volts

ANODE CURRENT:

Peak	108 max.	480 max.	amp
Average (Averaged over any interval of 10 sec- onds maximum).	18 max.	4 max.	amp
Average (Averaged over any interval of 0.2 sec- ond maximum).	18 max.	80 max.	amp
Fault, for duration of 0.15 second maximum	6000 max.	6000 max.	amp

RESISTANCE-WELDING-CONTROL SERVICE*

Two Tubes in Inverse-Parallel Circuit

Maximum Ratings, Absolute-Maximum Values:

For frequencies from 25 to 60 cps

Ratings I-A and I-B Apply to Operation Either (1) With-
out Water-Saving Thermostat, or (2) With Water-
Saving Thermostat Shunted by Auxiliary Contactor

RATING I-A

SUPPLY VOLTAGE (RMS)	250 max.	250 max.	volts
DEMAND POWER (During con- duction)	200 max.	600 max.	kva

*: See next page.



555I-A

IGNITRON

555I-A

DUTY [†]	15 max.	2.8 max.	%
ANODE CURRENT (Per tube):			
Peak	1130 max.	3400 max.	amp
Demand (RMS, during con- duction)*	800 max.	2400 max.	amp
Average (Averaged over any interval of 18 sec- onds maximum)*	56 max.	30.2 max.	amp
Fault, for duration of 0.15 second maximum	6720 max.	6720 max.	amp
RATING I-B			
SUPPLY VOLTAGE (RMS)	600 max.	600 max.	volts
DEMAND POWER (During con- duction)	200 max.	600 max.	kva
DUTY [†]	37 max.	6.7 max.	%
ANODE CURRENT (Per tube):			
Peak	466 max.	1410 max.	amp
Demand (RMS, during con- duction)*	333 max.	1000 max.	amp
Average (Averaged over any interval of 7.5 sec- onds maximum)*	56 max.	30.2 max.	amp
Fault, for duration of 0.15 second maximum	2800 max.	2800 max.	amp
Ratings II-A and II-B Apply to Operation with Water- Saving Thermostat Not Shunted by Auxiliary Contactor			
RATING II-A			
SUPPLY VOLTAGE (RMS)	250 max.	250 max.	volts
DEMAND POWER (During con- duction)	200 max.	600 max.	kva
DUTY [†]	9.7 max.	1.9 max.	%
ANODE CURRENT (Per tube):			
Peak	1130 max.	3400 max.	amp
Demand (RMS, during con- duction)*	800 max.	2400 max.	amp
Average (Averaged over any interval of 25.6 sec- onds maximum)*	36 max.	21 max.	amp
Fault, for duration of 0.15 second maximum	6720 max.	6720 max.	amp
RATING II-B			
SUPPLY VOLTAGE (RMS)	600 max.	600 max.	volts
DEMAND POWER (During con- duction)	200 max.	600 max.	kva
DUTY [†]	23 max.	4.7 max.	%

*, †, #: See next page.

5551-A



5551-A

IGNITRON

ANODE CURRENT (Per tube):

Peak	466 max.	1410 max.	amp
Demand (RMS, during con- duction)*.	333 max.	1000 max.	amp
Average (Averaged over any interval of 10.7 sec- onds maximum)*.	36 max.	21 max.	amp
Fault, for duration of 0.15 second maximum	925 max.	2800 max.	amp

IGNITOR

Maximum Ratings, Absolute-Maximum Values:

PEAK IGNITOR VOLTAGE:

Positive	Equal to anode volts
Negative	5 max. volts

IGNITOR CURRENT:

Peak	100 max.	amp
Average (Averaged over any interval of 5 seconds maximum).	1 max.	amp
RMS.	10 max.	amp

● RMS voltage, current, and demand kva are on the basis of full-cycle conduction (no phase delay) regardless of whether or not phase control is used.

▲ Defined as (cycles "on")/(cycles "on" + cycles "off") during the specified averaging time.

† For supply voltages between 250 volts and 600 volts, duty is proportional to supply voltage. For supply voltages lower than 250 volts, the values for 250 volts apply.

* For supply voltages between 250 volts and 600 volts, demand anode current and averaging time are each inversely proportional to supply voltage. For supply voltages lower than 250 volts, the values for 250 volts apply.

OPERATING CONSIDERATIONS

The 5551-A is equipped for mounting a thermostatic control with a mounting plate calibrated either for controlling the flow of cooling water through the water jacket, or for protection of the ignitron against overheating.

When the cooling water is circulated successively through the water jackets of two or more ignitrons, the *water-saving thermostat*, if used should be mounted on the ignitron connected directly to the water supply.

The water-saving thermostat, which has normally open contacts, is calibrated to close a circuit energizing a solenoid valve in the water-supply line and thus permit water flow to start when the temperature of the thermostat mounting plate exceeds approximately 35° C. Because of the lag between the heating of the ignitron envelope and the functioning of the water-saving thermostat to start water flow through the water jackets, the ignitron may overheat before the flow of cooling water starts.



555I-A

IGNITRON

555I-A

Such overheating can be prevented by the use of an auxiliary contactor shunted across the contacts of the water-saving thermostat and actuated by the welding-control switch. The contactor causes the solenoid valve in the water-supply line to open as soon as welding current flows.

If the water-saving thermostat is not shunted by an auxiliary contactor, it will be necessary to use a lower value of maximum average current than that which is specified when the auxiliary contactor is employed. The lower average current value is achieved by increasing the maximum averaging time and decreasing the maximum duty. Although the same maximum conduction time is permitted for both of these operating conditions, the use of the water-saving thermostat alone, without the auxiliary contactor requires a longer interval between successive welds than when the thermostat is shunted by the contactor.

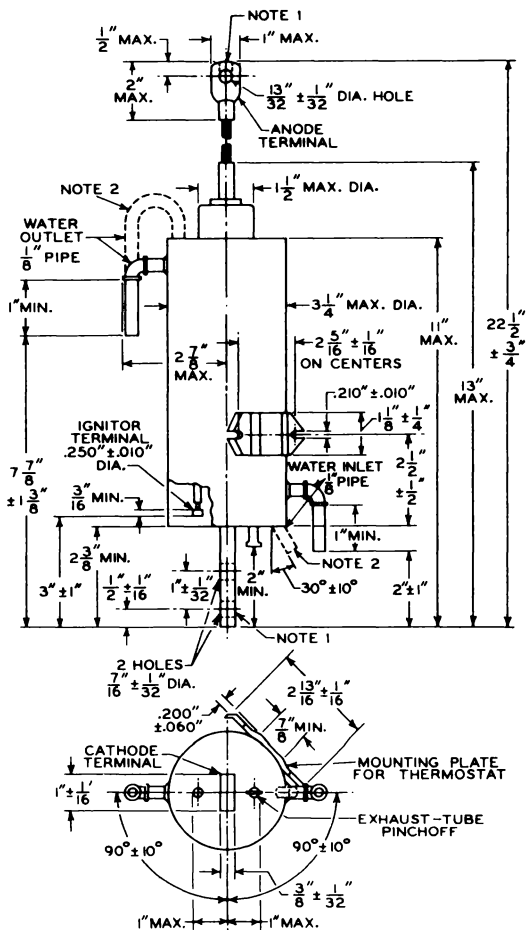
When a *protective thermostat* is used, it should be mounted on an ignitron from which the cooling water discharges into the drain. The protective thermostat is calibrated to open a set of normally closed contacts at a jacket temperature of approximately 52° C. The opening of these contacts causes a protective device to function. This device may be a relay opening the ignitor firing controls, or preferably, a circuit breaker which removes power from the ignitrons.

Care must be taken to insure that the water jacket of each ignitron is completely filled before power is applied. Tube operation with a partially filled water jacket may cause abnormal heating of the tube envelope, with resultant arc-back which impairs tube life. It is also necessary to arrange the cooling system so as to prevent any draining of the water jackets when the flow of water ceases.

5551-A



5551-A IGNITRON



92CM-9559

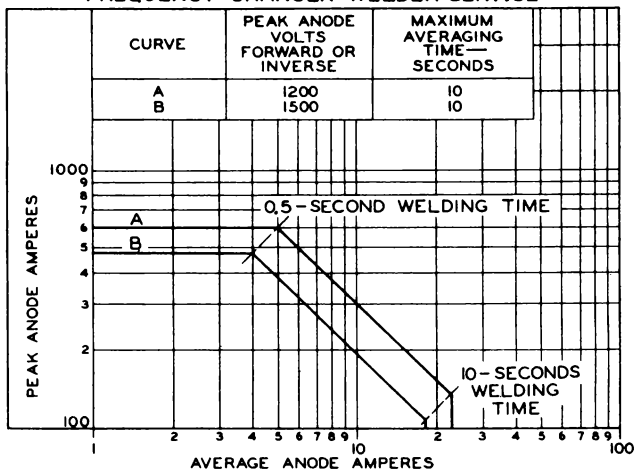
NOTE 1: MAY BE SLOTTED.**NOTE 2:** DASHED POSITION MANUFACTURER'S OPTION.



555I-A

555I-A

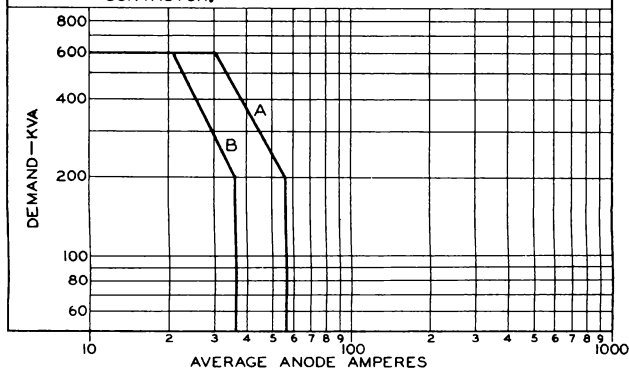
RATING CHARTS FREQUENCY-CHANGER-WELDER SERVICE



92CS-9695

RESISTANCE-WELDING-CONTROL SERVICE

TWO TUBES CONNECTED IN INVERSE PARALLEL.
RMS ANODE-SUPPLY VOLTS = 250 TO 600
CURVE A: NO WATER-SAVING THERMOSTAT, OR WATER-SAVING
THERMOSTAT SHUNTED BY AUXILIARY CONTACTOR.
CURVE B: WATER-SAVING THERMOSTAT WITHOUT AUXILIARY
CONTACTOR.



ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CS-9698

5551-A

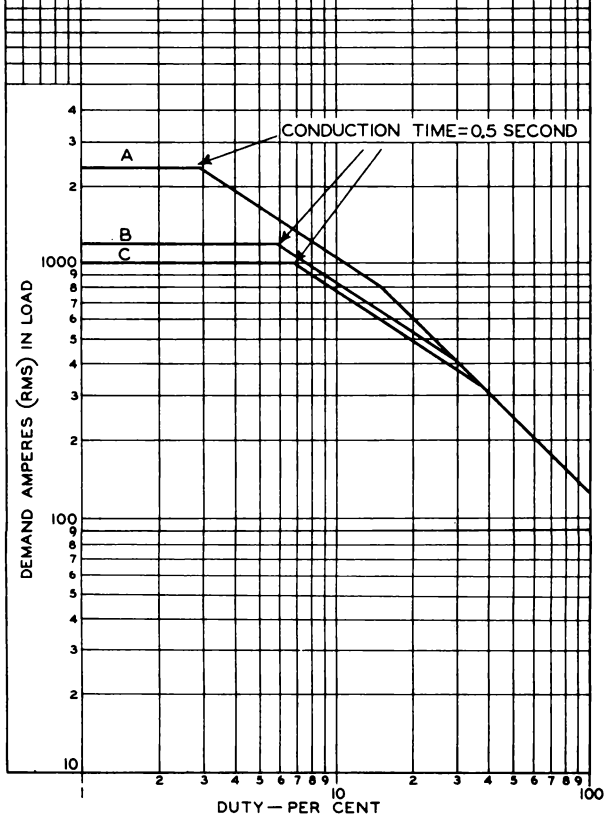


5551-A

RATING CHART RESISTANCE-WELDING-CONTROL SERVICE

TWO TUBES CONNECTED IN INVERSE PARALLEL.
 NO WATER-SAVING THERMOSTAT, OR WATER-
 SAVING THERMOSTAT SHUNTED BY
 AUXILIARY CONTACTOR.
 PROTECTIVE THERMOSTAT OPTIONAL.

CURVE	RMS ANODE- SUPPLY VOLTS	MAXIMUM AVERAGING TIME— SECONDS
A	250	18
B	500	9
C	600	7.5



ELECTRON TUBE DIVISION

92CM-9696

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



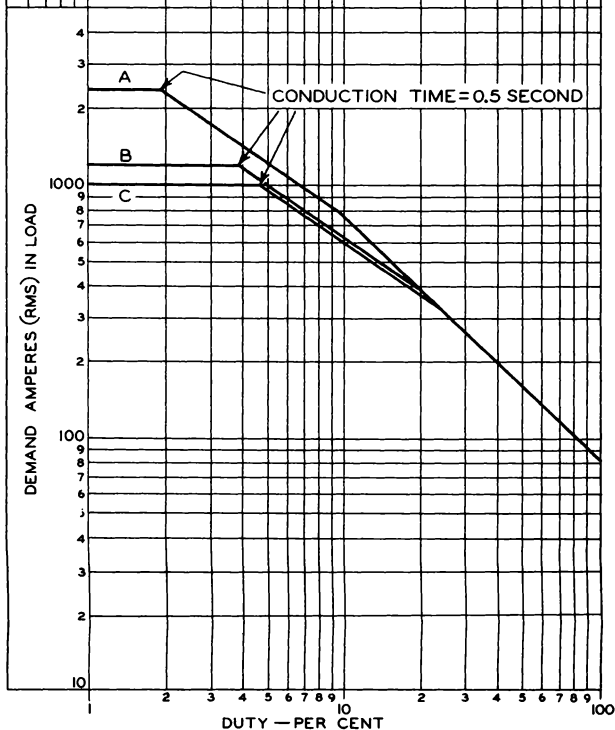
5551-A

5551-A

RATING CHART RESISTANCE-WELDING-CONTROL SERVICE

TWO TUBES CONNECTED IN INVERSE PARALLEL.
WATER-SAVING THERMOSTAT WITHOUT
AUXILIARY CONTACTOR.
PROTECTIVE THERMOSTAT OPTIONAL.

CURVE	RMS ANODE- SUPPLY VOLTS	MAXIMUM AVERAGING TIME— SECONDS
A	250	25.6
B	500	12.8
C	600	10.7



ELECTRON TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-9692



5552-A

5552-A IGNITRON

WATER-COOLED, STEEL-JACKETED, MERCURY-POOL-CATHODE
TYPE HAVING MOUNTING PLATE FOR THERMOSTATIC CONTROL
for resistance-welding control

GENERAL DATA

Electrical:

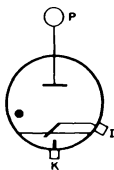
Cathode Excitation	Cyclic
Cathode-Spot Starting.	By Ignitor
Minimum Requirements for Cathode Excitation:	
Peak ignitor voltage required to fire. . .	200 volts
Peak ignitor current required to fire. . .	30 amp
Starting time at required voltage or current	100 μ sec
Tube Voltage Drop:	
At peak anode current of 6800 amperes. . .	28 volts
At peak anode current of 440 amperes . . .	14 volts

Mechanical:

Operating Position	Vertical, flexible lead up
Maximum Overall Length (Including flexible lead)	27-1/4"
Maximum Radius (Including water connections)	3-5/8"
Weight	8 lbs

Terminal Connections (*See Dimensional Outline*):

P—Anode
Terminal
(Flexible
lead)
K—Cathode
Terminal
(Bar oppo-
site anode
terminal)



I—Ignitor
Terminal
(Within
jacket
skirt at
cathode
end)

Cooling:

Type	Water
Minimum inlet water temperature.	10 $^{\circ}$ C
Maximum outlet water temperature	40 $^{\circ}$ C
Minimum water flow	1.5 gpm
Maximum water-temperature rise	6 $^{\circ}$ C
Maximum pressure drop.	6 psi

INTERMITTENT RECTIFIER SERVICE

Maximum Ratings, Absolute-Maximum Values:

*For zero phase-control angle and
frequencies from 25 to 60 cps*

PEAK ANODE VOLTAGE:

Forward.	500 max. volts
Inverse.	500 max. volts

5552-A



5552-A

IGNITRON

ANODE CURRENT:

Peak	1600 max.	amp
Average (Averaged over any interval of 6 seconds maximum)	100 max.	amp
Fault, for duration of 0.15 sec- ond maximum.	6000 max.	amp

RESISTANCE-WELDING-CONTROL SERVICE*

Two Tubes in Inverse-Parallel Circuit

Maximum Ratings, Absolute-Maximum Values:

For frequencies from 25 to 60 cps

Ratings I-A and I-B Apply to Operation Either (1) With-
out Water-Saving Thermostat, or (2) With Water-
Saving Thermostat Shunted by Auxiliary Contactor

RATING I-A

	Column 1*	Column 2*	
SUPPLY VOLTAGE (RMS)	250 max.	250 max.	volts
DEMAND POWER (During con- duction)	400 max.	1200 max.	kva
DUTY†	19 max.	3.5 max.	%
ANODE CURRENT (Per tube):			
Peak	2260 max.	6800 max.	amp
Demand (RMS, during con- duction)*.	1600 max.	4800 max.	amp
Average (Averaged over any interval of 14 sec- onds maximum)*.	140 max.	75.6 max.	amp
Fault, for duration of 0.15 second maximum.	13450 max.	13450 max.	amp

RATING I-B

	Column 1*	Column 2*	
SUPPLY VOLTAGE (RMS)	600 max.	600 max.	volts
DEMAND POWER (During con- duction)	400 max.	1200 max.	kva
DUTY†	47 max.	8.5 max.	%
ANODE CURRENT (Per tube):			
Peak	945 max.	2830 max.	amp
Demand (RMS, during con- duction)*.	666 max.	2000 max.	amp
Average (Averaged over any interval of 5.8 sec- onds maximum)*.	140 max.	75.6 max.	amp
Fault, for duration of 0.15 second maximum.	5600 max.	5600 max.	amp

*, †, *, *: See next page.



5552-A

IGNITRON

5552-A

Ratings II-A and II-B Apply to Operation with Water-Saving Thermostat Not Shunted by Auxillary Contactor

RATING II-A

	Column 1"	Column 2"	
SUPPLY VOLTAGE (RMS)	250 max.	250 max.	volts
DEMAND POWER (During con- duction)	400 max.	1200 max.	kva
DUTY [†]	11 max.	2 max.	%
ANODE CURRENT (Per tube):			
Peak	2260 max.	6800 max.	amp
Demand (RMS, during conduction) [#]	1600 max.	4800 max.	amp
Average (Averaged over any interval of 23.5 sec- onds maximum) [#]	80 max.	43 max.	amp
Fault, for duration of 0.15 second maximum.	13450 max.	13450 max.	amp

RATING II-B

	Column 1"	Column 2"	
SUPPLY VOLTAGE (RMS)	600 max.	600 max.	volts
DEMAND POWER (During con- duction)	400 max.	1200 max.	kva
DUTY [†]	26 max.	4.8 max.	%
ANODE CURRENT (Per tube):			
Peak	945 max.	2830 max.	amp
Demand (RMS, during conduction) [#]	666 max.	2000 max.	amp
Average (Averaged over any interval of 10 sec- onds maximum) [#]	80 max.	43 max.	amp
Fault, for duration of 0.15 second maximum.	5600 max.	5600 max.	amp

IGNITOR

Maximum Ratings, Absolute-Maximum Values:

PEAK IGNITOR VOLTAGE:		
Positive	Equal to anode	volts
Negative	5 max.	volts
IGNITOR CURRENT:		
Peak	100 max.	amp
Average (Averaged over any interval of 5 seconds maximum).	1 max.	amp
RMS.	10 max.	amp

⊙, ▲, †, #, *: See next page.

5552-A



5552-A IGNITRON

- RMS voltage, current, and demand kva are on the basis of full-cycle conduction (no phase delay) regardless of whether or not phase control is used.
- ▲ Defined as (cycles "on")/(cycles "on" + cycles "off") during the specified averaging time.
- † For supply voltages between 250 volts and 600 volts, duty is proportional to supply voltage. For supply voltages lower than 250 volts, the values for 250 volts apply.
- # For supply voltages between 250 volts and 600 volts, demand anode current and averaging time are each inversely proportional to supply voltage. For supply voltages lower than 250 volts, the values for 250 volts apply.
- * Column 1 represents operation at maximum average anode current; Column 2 represents operation at maximum demand current.

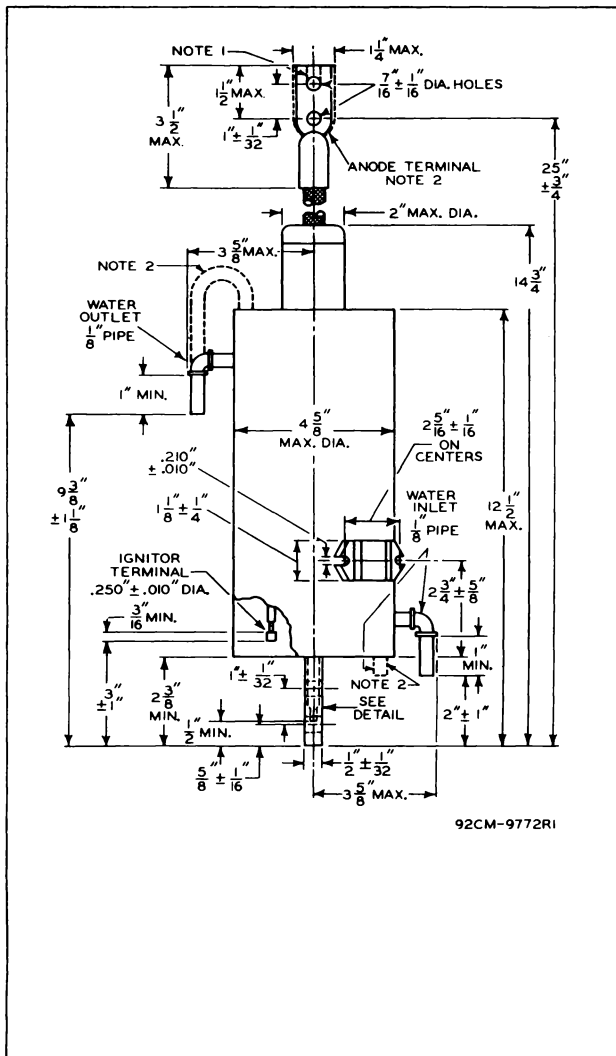
OPERATING CONSIDERATIONS
for the 5552-A are the same as
those shown for Type 5551-A



5552-A

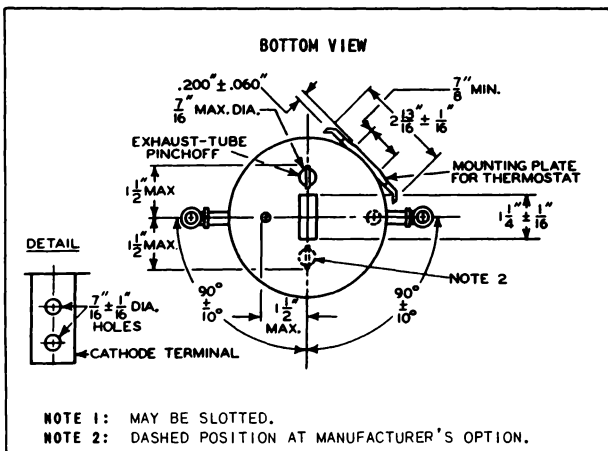
IGNITRON

5552-A





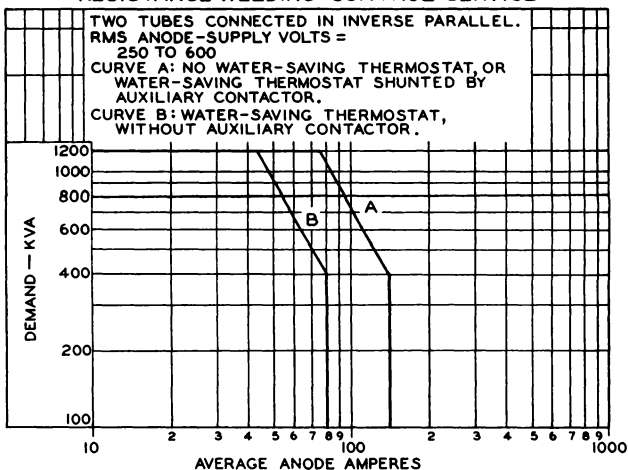
5552-A
IGNITRON



4-59

CE-9772R1B

RATING CHART RESISTANCE-WELDING-CONTROL SERVICE



ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CS-9712



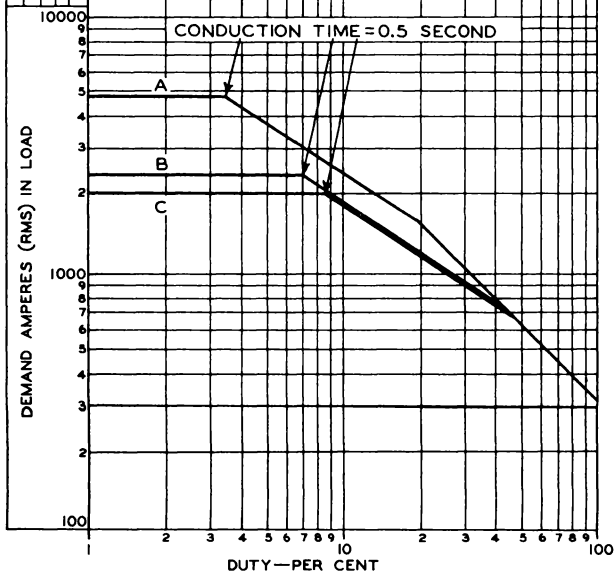
5552-A

5552-A

RATING CHART **RESISTANCE-WELDING-CONTROL SERVICE**

TWO TUBES CONNECTED IN INVERSE PARALLEL.
NO WATER- SAVING THERMOSTAT, OR WATER -
SAVING THERMOSTAT SHUNTED BY
AUXILIARY CONTACTOR
PROTECTIVE THERMOSTAT OPTIONAL.

CURVE	RMS ANODE- SUPPLY VOLTS	MAXIMUM AVERAGING TIME— SECONDS
A	250	14
B	500	7
C	600	5.8



ELECTRON TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-9710

5552-A

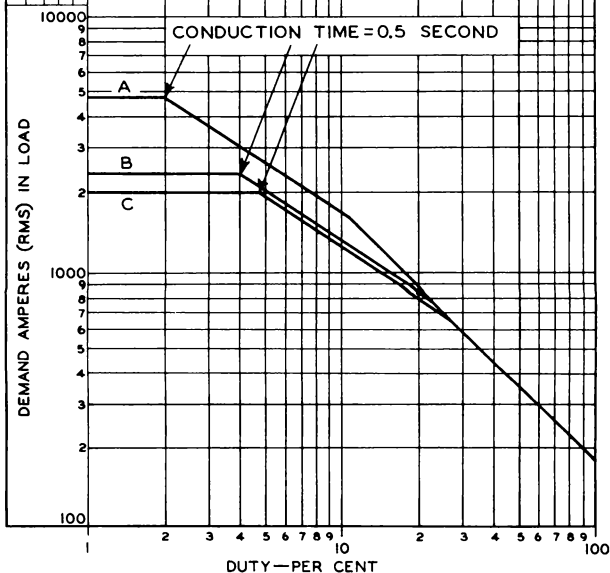


5552-A

RATING CHART RESISTANCE-WELDING-CONTROL SERVICE

TWO TUBES CONNECTED IN INVERSE PARALLEL.
 WATER-SAVING THERMOSTAT WITHOUT
 AUXILIARY CONTACTOR.
 PROTECTIVE THERMOSTAT OPTIONAL.

CURVE	RMS ANODE- SUPPLY VOLTS	MAXIMUM AVERAGING TIME— SECONDS
A	250	23.5
B	500	11.8
C	600	10



ELECTRON TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-9711



5553-B

5553-B IGNITRON

WATER-COOLED, STEEL-JACKETED, MERCURY-POOL-CATHODE
TYPE HAVING MOUNTING PLATE FOR THERMOSTATIC CONTROL

For resistance-welding control

GENERAL DATA

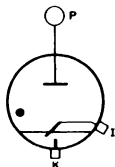
Electrical:

Cathode Excitation.	Cyclic
Cathode-Spot Starting.	By Ignitor
Minimum Requirements for Cathode Excitation:	
Peak ignitor voltage required to fire	200 volts
Peak ignitor current required to fire	30 amp
Starting time at required voltage or current.	100 μ sec
Tube Voltage Drop:	
At peak anode current of 13600 amperes.	36 volts
At peak anode current of 1115 amperes	17 volts

Mechanical:

Operating Position.	Vertical, flexible lead up
Maximum Overall Length (Including flexible lead).	31-3/8"
Maximum Radius (Including water connections).	4-11/16"
Weight.	21 lbs
Terminal Connections (<i>See Dimensional Outline</i>):	

P - Anode
Terminal
(Flexible
lead)
K - Cathode
Terminal
(Bar oppo-
site anode
terminal)



I - Ignitor
Terminal
(Within
jacket
skirt at
cathode
end)

Cooling:

Type.	Water
Minimum inlet water temperature	10 $^{\circ}$ C
Maximum outlet water temperature.	40 $^{\circ}$ C
Minimum water flow.	3 gpm
Maximum water-temperature rise.	9 $^{\circ}$ C
Maximum pressure drop	5.1 psi

INTERMITTENT RECTIFIER SERVICE and FREQUENCY-CHANGER WELDER SERVICE

Maximum Ratings, Absolute-Maximum Values:

*For zero phase-control angle and frequencies
from 50 to 60 cps*

RATING I

PEAK ANODE VOLTAGE:

Forward	600 max.	600 max. volts
Inverse	600 max.	600 max. volts

5553-B



5553-B

IGNITRON

ANODE CURRENT:

Peak.	1140 max.	4000 max.	amp
Average (Averaged over any interval of 6.25 seconds maximum)	190 max.	54 max.	amp
Average (Averaged over any interval of 0.2 second maximum)	190 max.	666 max.	amp
Fault, for duration of 0.15 second maximum.	50000 max.	50000 max.	amp

RATING II

PEAK ANODE VOLTAGE:

Forward	1200 max.	1200 max.	volts
Inverse	1200 max.	1200 max.	volts

ANODE CURRENT:

Peak.	840 max.	3000 max.	amp
Average (Averaged over any interval of 6.25 seconds maximum)	140 max.	40 max.	amp
Average (Averaged over any interval of 0.2 second maximum)	140 max.	500 max.	amp
Fault, for duration of 0.15 second maximum.	37500 max.	37500 max.	amp

RATING III

PEAK ANODE VOLTAGE:

Forward	1500 max.	1500 max.	volts
Inverse	1500 max.	1500 max.	volts

ANODE CURRENT:

Peak.	672 max.	2400 max.	amp
Average (Averaged over any interval of 6.25 seconds maximum)	112 max.	32 max.	amp
Average (Averaged over any interval of 0.2 second maximum)	112 max.	400 max.	amp
Fault, for duration of 0.15 second maximum.	30000 max.	30000 max.	amp

RESISTANCE-WELDING-CONTROL SERVICE®

Two Tubes in Inverse-Parallel Circuit

Maximum Ratings, Absolute-Maximum Values:

For frequencies from 25 to 60 cps

Ratings I-A and I-B Apply to Operation Either (1) Without Water-Saving Thermostat, or (2) With Water-Saving Thermostat Shunted by Auxiliary Contactor

RATING I-A

	Column 1*	Column 2*	
SUPPLY VOLTAGE (RMS)	250 max.	250 max.	volts



5553-B

IGNITRON

5553-B

	Column 1*	Column 2*	
DEMAND POWER (During conduction)	800 max.	2400 max.	kva
DUTY*†.	24.6 max.	4.4 max.	%
ANODE CURRENT (Per tube):			
Peak.	4530 max.	13600 max.	amp
Demand (RMS, during conduction)*.	3200 max.	9600 max.	amp
Average (Averaged over any interval of 11 sec- onds maximum)*.	355 max.	192 max.	amp
Fault, for duration of 0.15 second maximum.	27000 max.	27000 max.	amp
RATING I-B			
	Column 1*	Column 2*	
SUPPLY VOLTAGE (RMS).	600 max.	600 max.	volts
DEMAND POWER (During conduction)	800 max.	2400 max.	kva
DUTY*†.	59 max.	10.7 max.	%
ANODE CURRENT (Per tube):			
Peak.	1890 max.	5660 max.	amp
Demand (RMS, during conduction)*.	1330 max.	4000 max.	amp
Average (Averaged over any interval of 4.6 sec- onds maximum)*.	355 max.	192 max.	amp
Fault, for duration of 0.15 second maximum.	11200 max.	11200 max.	amp
Ratings II-A and II-B Apply to Operation with Water- Saving Thermostat Not Shunted by Auxiliary Contactor			
RATING II-A			
	Column 1*	Column 2*	
SUPPLY VOLTAGE (RMS).	250 max.	250 max.	volts
DEMAND POWER (During conduction)	800 max.	2400 max.	kva
DUTY*†.	12.2 max.	2.2 max.	%
ANODE CURRENT (Per tube):			
Peak.	4530 max.	13600 max.	amp
Demand (RMS, during conduction)*.	3200 max.	9600 max.	amp
Average (Averaged over any interval of 22.4 sec- onds maximum)*.	175 max.	96 max.	amp
Fault, for duration of 0.15 second maximum.	27000 max.	27000 max.	amp

⊕, •, †, *, #: See next page.

5553-B



5553-B IGNITRON

RATING II-B

	Column 1*	Column 2*	
SUPPLY VOLTAGE (RMS)	600 max.	600 max.	volts
DEMAND POWER (During conduction)	800 max.	2400 max.	kva
DUTY†.	29 max.	5.3 max.	%
ANODE CURRENT (Per tube):			
Peak.	1890 max.	5660 max.	amp
Demand (RMS, during conduction)*.	1330 max.	4000 max.	amp
Average (Averaged over any interval of 9.4 sec- onds maximum)*.	175 max.	96 max.	amp
Fault, for duration of 0.15 second maximum.	11200 max.	11200 max.	amp

IGNITOR

Maximum Ratings, Absolute-Maximum Values:

PEAK IGNITOR VOLTAGE:

Positive.	Equal to anode volts
Negative.	5 max. volts

IGNITOR CURRENT:

Peak.	100 max.	amp
Average (Averaged over any interval of 5 seconds maximum)	1 max.	amp
RMS	10 max.	amp

* RMS voltage, current, and demand kva are on the basis of full-cycle conduction (no phase delay) regardless of whether or not phase control is used.

* Defined as (cycles "on")/(cycles "on" + cycles "off") during the specified averaging time.

† For supply voltages between 250 volts and 600 volts, duty is proportional to supply voltage. For supply voltages lower than 250 volts, the values for 250 volts apply.

* Column 1 represents operation at maximum average anode current; Column 2 represents operation at maximum demand power.

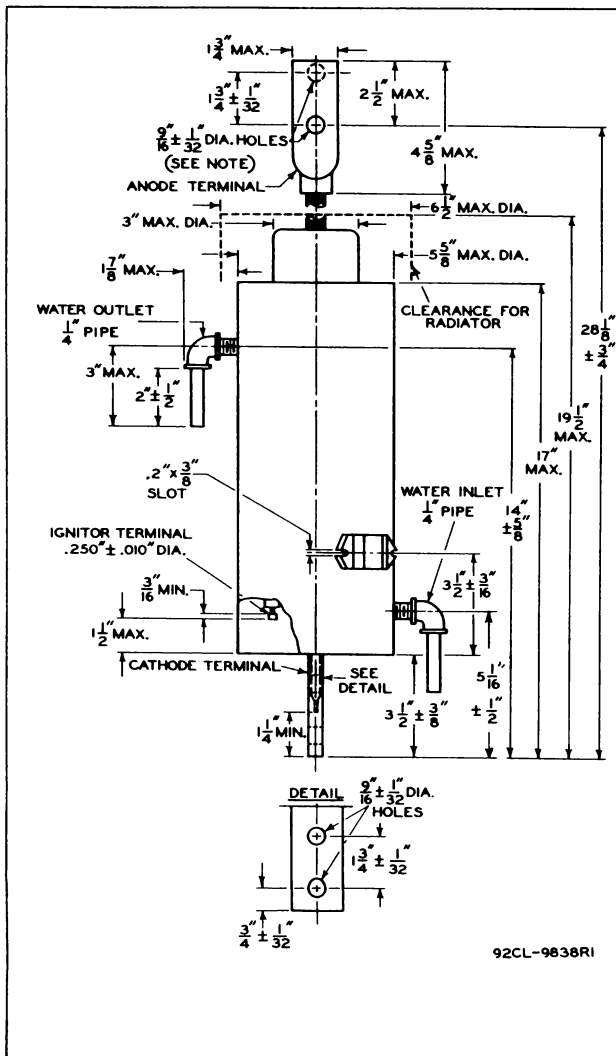
* For supply voltages between 250 volts and 600 volts, demand anode current and averaging time are each inversely proportional to supply voltage. For supply voltages lower than 250 volts, the values for 250 volts apply.

OPERATING CONSIDERATIONS
for the 5553-B are the same as
those shown for Type 5551-A



5553-B IGNITRON

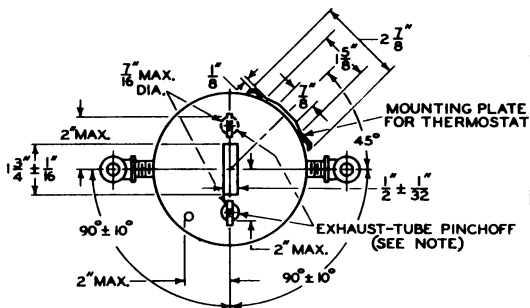
5553-B





5553-B
IGNITRON

BOTTOM VIEW



NOTE: DASHED POSITION AT MANUFACTURER'S OPTION.

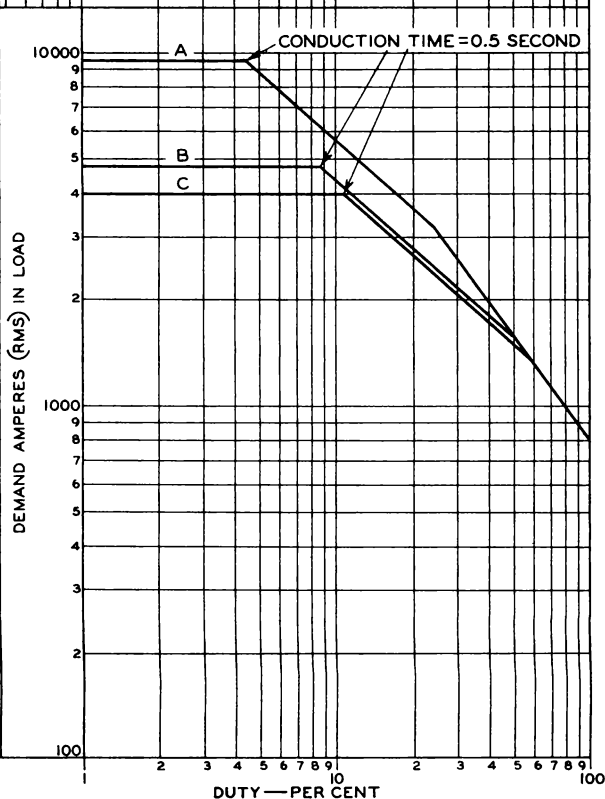


5553-B

5553-B
RATING CHART
RESISTANCE-WELDING-CONTROL SERVICE

TWO TUBES CONNECTED IN INVERSE PARALLEL.
NO WATER-SAVING THERMOSTAT, OR WATER-
SAVING THERMOSTAT SHUNTED BY
AUXILIARY CONTACTOR.
PROTECTIVE THERMOSTAT OPTIONAL.

CURVE	RMS ANODE- SUPPLY VOLTS	MAXIMUM AVERAGING TIME— SECONDS
A	250	11
B	500	9.2
C	600	4.6



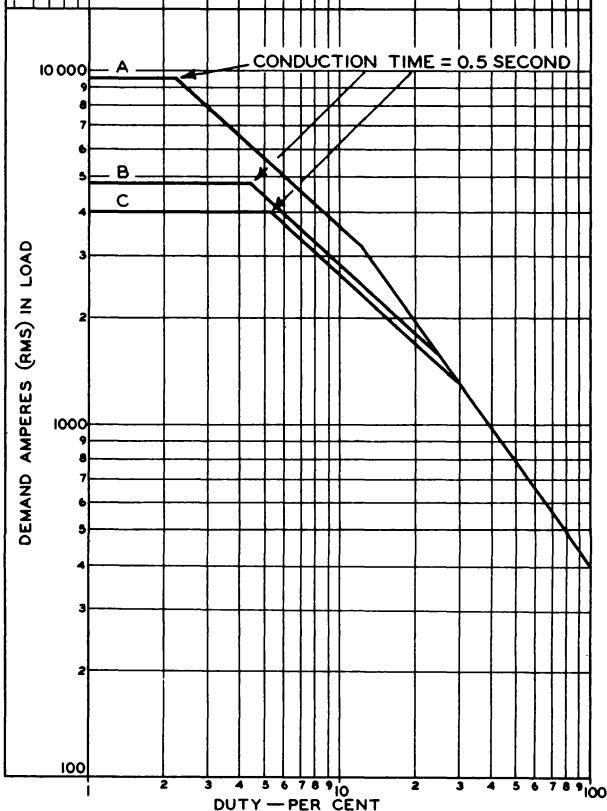
5553-B



5553-B
RATING CHART
RESISTANCE-WELDING-CONTROL SERVICE

TWO TUBES CONNECTED IN INVERSE PARALLEL.
 WATER-SAVING THERMOSTAT WITHOUT
 AUXILIARY CONTACTOR.
 PROTECTIVE THERMOSTAT OPTIONAL.

CURVE	RMS ANODE- SUPPLY VOLTS	MAXIMUM AVERAGING TIME— SECONDS
A	250	22.4
B	500	18.8
C	600	9.4



ELECTRON TUBE DIVISION

92CM-9823

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

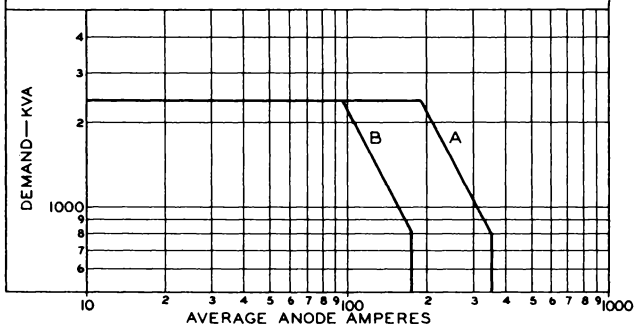


5553-B

5553-B

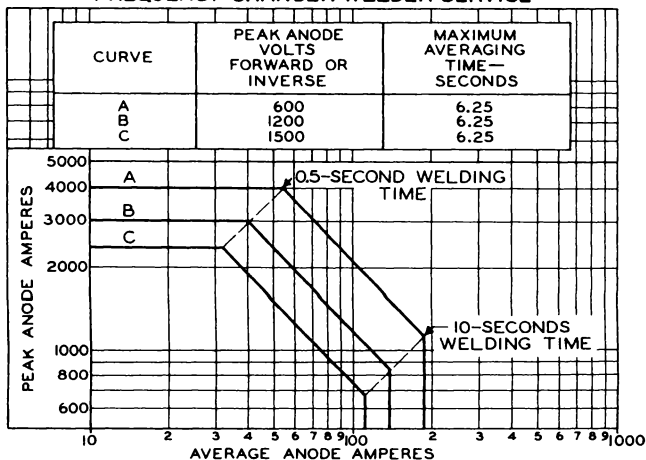
RATING CHARTS RESISTANCE-WELDING-CONTROL SERVICE

TWO TUBES CONNECTED IN INVERSE PARALLEL.
 RMS ANODE-SUPPLY VOLTS = 250 TO 600
 CURVE A: NO WATER-SAVING THERMOSTAT, OR WATER-SAVING THERMOSTAT SHUNTED BY AUXILIARY CONTACTOR.
 CURVE B: WATER-SAVING THERMOSTAT WITHOUT AUXILIARY CONTACTOR.



92CS-9825

FREQUENCY-CHANGER WELDER SERVICE



ELECTRON TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CS-9824



5554

5554

IGNITRON

General:

DATA

Cathode. Pool Type
 Number of Ignitors* 2
 Number of Main Anodes. 1
 Number of Auxiliary Anodes 1

Peak Voltage Drop:

At 100 Amp. Peak-Anode Current 12.6 volts
 At 300 Amp. Peak Anode Current 14.4 volts
 At 600 Amp. Peak Anode Current 17.3 volts

Cooling:

Type Water
 Typical Flow 1.5 to 3 gal./min.
 Pressure Drop at Above Flow. 2 to 5 lb./sq.in.
 Temperature Rise at Lower Rate of Flow

(150 Amp per Anode) 6°C

Mounting Position. Vertical, Flexible Lead Up

Maximum Rigid Length (Approx.) 17-1/2"

Diameter, Including Cooling Couplings. 7-1/2" ± 1/8"

RECTIFIER SERVICE

For frequencies from 25 to 60 Cycles, Phase Retard = 0

Maximum Ratings, Absolute Values:

PEAK FORWARD ANODE VOLTAGE . .	900 max.	2100 max.	volts
PEAK INVERSE ANODE VOLTAGE . .	900 max.	2100 max.	volts
PEAK ANODE CURRENT	900 max.	600 max.	amp
AVERAGE CONTINUOUS ANODE CUR.	100 max.	75 max.	amp
2-HOUR AVERAGE ANODE CURRENT*	150 max.	112.5 max.	amp
1-MINUTE AVERAGE ANODE CUR.**	200 max.	150 max.	amp
SURGE ANODE CURRENT for			
0.15 sec. max.	6000 max.	4500 max.	amp
OUTLET WATER TEMPERATURE . . .	60 max.	45 max.	°C
INLET WATER TEMPERATURE. . . .	6 min.	6 min.	°C
WATER FLOW, AT CONTINUOUS			
AVERAGE ANODE CUR. RATING. . .	1.5 min.	1.5 min.	gpm
WATER FLOW, AT NO LOAD#	0.5 min.	0.5 min.	gpm
PEAK INVERSE AUXILIARY ANODE VOLTAGE:			
With Anode Conducting.	25 max.	25 max.	volts
With Anode Not Conducting. . .	150 max.	150 max.	volts
AVERAGE AUXILIARY ANODE CUR. .	5 max.	5 max.	amp
PEAK POSITIVE IGNITOR VOLTAGE. .	900 max.	2100 max.	volts
PEAK NEGATIVE IGNITOR VOLTAGE. .	5 max.	..	volts
PEAK IGNITOR CURRENT	100 max.	..	volts
AVERAGE IGNITOR CURRENT## . . .	2 max.	..	volts
IGNITION TIME.	100 max.	..	volts

GENERAL REQUIREMENTS for SELF-EXCITATION and
 SEPARATE EXCITATION are given on the next page

•, *, **, #, ##: See next page.

5554



5554

IGNITRON

AC WELDER-CONTROL SERVICE

Ratings for 2400 volts,rms, 25 to 60 cycles

Maximum Ratings, Absolute Values:

DEMAND	1200 max.	kva
CORRESPONDING AVERAGE ANODE CURRENT.	75 max.	amp
AVERAGE ANODE CURRENT.	113 max.	amp
CORRESPONDING DEMAND	600 max.	kva
TIME OF AVERAGING ANODE CURRENT:		
At 2400 v RMS	1.5 max.	sec
SURGE ANODE CURRENT, for 0.15 sec. max.	3000 max.	amp
WATER FLOW	1.5 min.	gpm
OUTLET WATER TEMPERATURE	30 max.	°C
PEAK INVERSE AUXILIARY ANODE VOLTAGE:		
With Anode Conducting.	25 max.	volts
With Anode Not Conducting.	150 max.	volts
AVERAGE AUXILIARY ANODE CUR.	5 max.	amp
PEAK POSITIVE IGNITOR VOLTAGE.	2400 max.	volts
PEAK NEGATIVE IGNITOR VOLTAGE.	5 max.	volts
PEAK IGNITOR CURRENT	100 max.	amp
AVERAGE IGNITOR CURRENT##	2 max.	amp
IGNITION TIME.	100 max.	μsec

GENERAL REQUIREMENTS for SELF-EXCITATION and
SEPARATE-EXCITATION are given below

SELF-EXCITATION (ANODE FIRING)

See Circuit 92CS-6722

PEAK IGNITOR VOLTAGE	150 min.	volts
PEAK IGNITOR CURRENT	40 min.	amp
Ignitor series resistance for anode firing at anode voltages of:		
600 volts or less.	4	ohms
601 to 1000 volts (Approx.)	10	ohms
1001 to 1500 volts (Approx.)	20	ohms
1501 to 2000 volts (Approx.)	35	ohms
2001 to 2400 volts (Approx.)	50	ohms

SEPARATE EXCITATION (CAPACITOR FIRING)

See Circuit 92CS-6722

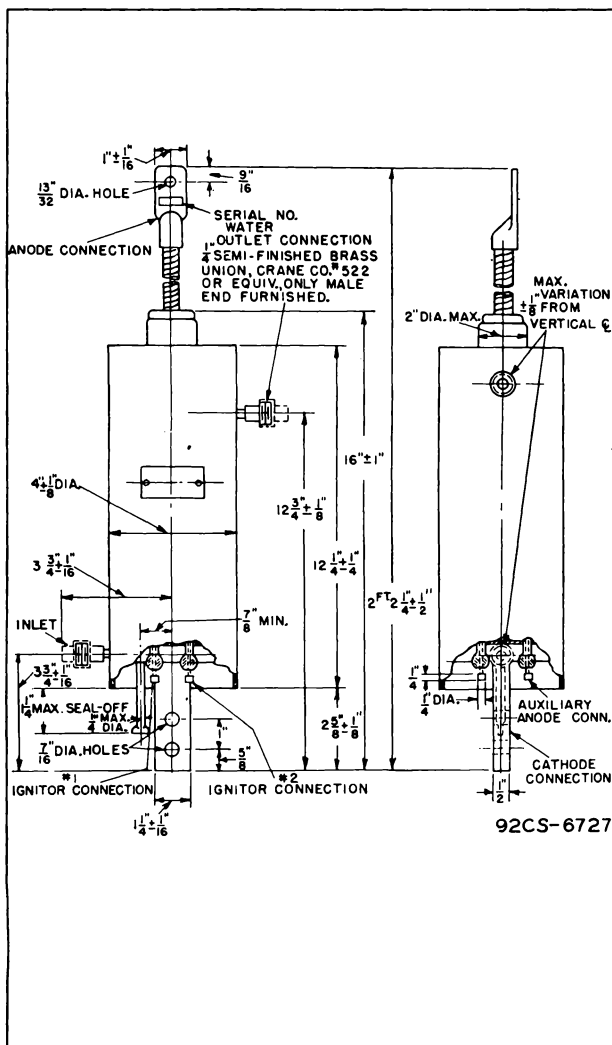
Minimum volt-ampere requirements are shown on Curve 92CS-6723

- Use only one ignitor at a time.
- * Averaged over any 2-minute interval.
- ** Averaged over any 1-minute interval.
- # For systems in which the flow of water is controlled by the load.
- ## Averaged over any 10-second interval.



5554 IGNITRON

5554

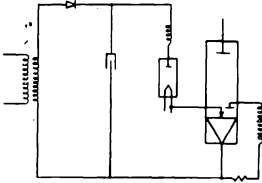
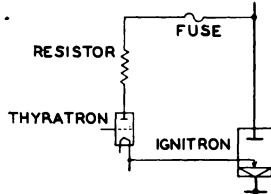


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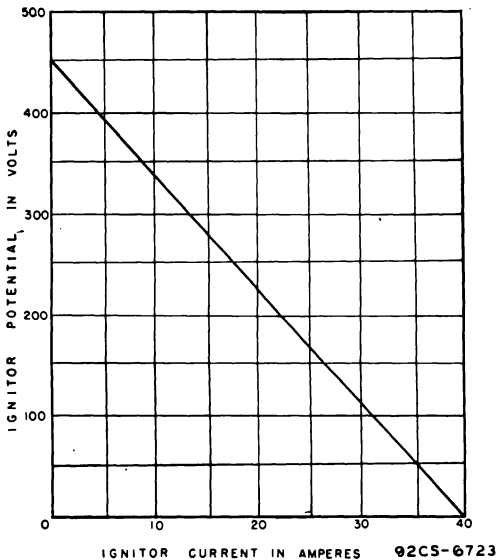


5554

IGNITRON

ELEMENTARY CIRCUIT FOR
CAPACITOR FIRINGELEMENTARY CIRCUIT FOR
ANODE FIRING

92CS-6722

MINIMUM VOLT-AMPERE REQUIREMENTS FOR
SEPARATE-EXCITATION FIRING SYSTEMS

92CS-6723

MAY 1, 1946

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-6722-6723

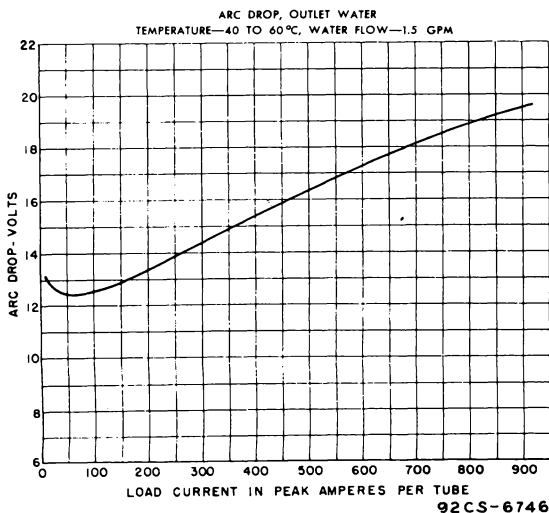
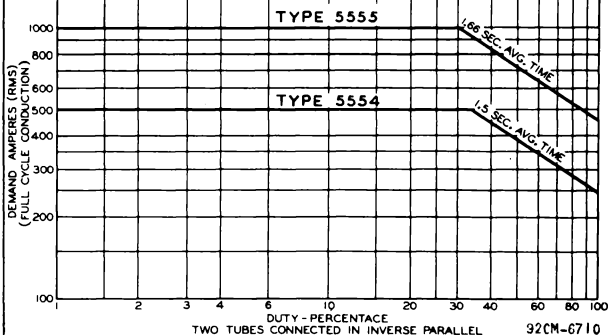


5554 IGNITRON

5554

WELDER-CONTROL SERVICE

ANODE-SUPPLY VOLTAGE 2400 VOLTS RMS
MAX. OUTLET WATER TEMP = 30°C
MIN. WATER FLOW 1.5 GAL./MIN.



MAY 1, 1946

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-6710-6746



5555 IGNITRON

5555

General:

DATA

Cathode	Pool type
Number of Ignitors •	2
Number of Main Anodes	1
Number of Auxiliary Anodes	1
Peak Voltage Drop:	
At 100 Amp Peak Anode Current.	12.6 volts
At 300 Amp Peak Anode Current.	14.1 volts
At 600 Amp Peak Anode Current.	16.2 volts
At 1200 Amp Peak Anode Current	19.1 volts
Cooling:	
Type	Water
Typical Flow	3 to 5 gal./min.
Pressure Drop at Above Flow.	3 to 8 lb./sq.in.
Temp. Rise at Lower Rate of Flow (300 Amp per Anode).	7°C
Mounting Position.	Vertical, Flexible Lead Up
Maximum Rigid Length (Approx.)	18-1/2"
Diameter, Including Cooling Couplings.	9" ± 1/8"

RECTIFIER SERVICE

For Frequencies from 25 to 60 cycles, Phase Retard = 0

Maximum Ratings, Absolute Values:

PEAK FORWARD ANODE VOLTAGE . .	900 max.	2100 max.	volts
PEAK INVERSE ANODE VOLTAGE . .	900 max.	2100 max.	volts
PEAK ANODE CURRENT	1800 max.	1200 max.	amp
AVERAGE CONTINUOUS ANODE CUR. .	200 max.	150 max.	amp
2-HOUR AVERAGE ANODE CUR.* . .	300 max.	225 max.	amp
1-MINUTE AVERAGE ANODE CUR.**	400 max.	300 max.	amp
SURGE ANODE CURRENT for 0.15 sec. max.	12000 max.	9000 max.	amp
OUTLET WATER TEMPERATURE . . .	60 max.	45 max.	°C
INLET WATER TEMPERATURE. . . .	6 min.	6 min.	°C
WATER FLOW, AT CONTINUOUS AVERAGE ANODE CUR. RATING	3 min.	3 min.	gpm
WATER FLOW, AT NO LOAD#	1 min.	1 min.	gpm
PEAK INVERSE AUXILIARY ANODE VOLTAGE:			
With anode conducting.	25 max.	25 max.	volts
With anode not conducting. . . .	150 max.	150 max.	volts
AVERAGE AUXILIARY ANODE CUR. .	5 max.	5 max.	amp
PEAK POSITIVE IGNITOR VOLTAGE. .	900 max.	2100 max.	volts
PEAK NEGATIVE IGNITOR VOLTAGE. .	5 max.	..	volts
PEAK IGNITOR CURRENT	100 max.	..	amp
AVERAGE IGNITOR CURRENT##. . . .	2 max.	..	amp
IGNITION TIME.	100 max.	..	μsec

GENERAL REQUIREMENTS for SELF-EXCITATION and
SEPARATE EXCITATION are given on the next page

•, *, **, #, ##: See next page.

MAY 1, 1946

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA

5555



5555 IGNITRON

AC WELDER - CONTROL SERVICE

Ratings for 2400 volts rms, 25 to 60 cycles

Maximum Ratings, Absolute Values:

DEMAND	2400 max.	kva
CORRESPONDING AVERAGE ANODE CURRENT.	135 max.	amp
AVERAGE ANODE CURRENT.	207 max.	amp
CORRESPONDING DEMAND	1105 max.	kva
TIME OF AVERAGING ANODE CURRENT		
at 2400 volts rms	1.66 max.	sec
SURGE ANODE CURRENT, for 0.15 sec.max.	6000 max.	amp
WATER FLOW	3 min.	gal./
		min.
		°C
OUTLET WATER TEMPERATURE	30 max.	
PEAK INVERSE AUXILIARY ANODE VOLTAGE:		
With anode conducting	25 max.	volts
With anode not conducting.	150 max.	volts
AVERAGE AUXILIARY ANODE CURRENT.	5 max.	amp
PEAK POSITIVE IGNITOR VOLTAGE.	2400 max.	volts
PEAK NEGATIVE IGNITOR VOLTAGE.	5 max.	volts
PEAK IGNITOR CURRENT	100 max.	amp
AVERAGE IGNITOR CURRENT##	2 max.	amp
IGNITION TIME.	100 max.	μsec

Demand-ampere requirements are shown on curve 92CM-6710
under type 5554

SELF-EXCITATION (ANODE FIRING)

See Circuit 92CS-6722 under type 5554

PEAK IGNITOR VOLTAGE	150 min.	volts
PEAK IGNITOR CURRENT	40 min.	amp
Ignitor series resistance for anode firing		
at anode voltages of:		
600 volts or less (Approx.).	4 . .	ohms
601 to 1000 volts (Approx.).	10 . .	ohms
1001 to 1500 volts (Approx.).	20 . .	ohms
1501 to 2000 volts (Approx.).	35 . .	ohms
2001 to 2400 volts (Approx.).	50 . .	ohms

SEPARATE EXCITATION (CAPACITOR FIRING)

See Circuit 92CS-6722 under type 5554

Minimum volt-ampere requirements are shown on curve 92CS-6725
under type 5554

- Use only one ignitor at a time.
- * Averaged over any 2-minute interval.
- ** Averaged over any 1-minute interval.
- # For systems in which the flow of water is controlled by the load.
- ## Averaged over any 10-second interval.



IGNITRON

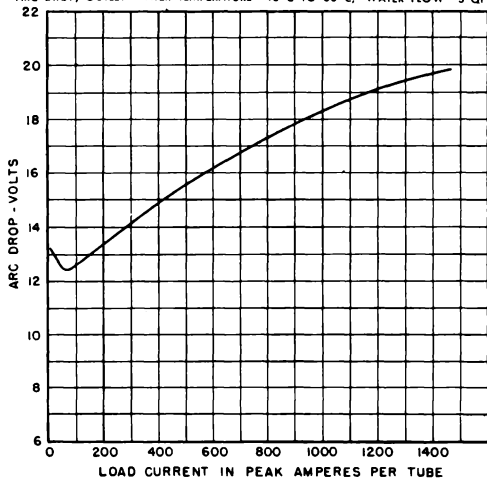


5555



5555 IGNITRON

ARC DROP, OUTLET WATER TEMPERATURE—40°C TO 60°C, WATER FLOW—3 GPM



92CS-6724

MAY 1, 1946

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-6724



5557
THYRATRON
 MERCURY-VAPOR TRIODE

5557

DATA

Electrical:

Filament:

Voltage*	2.5	volts
Current	5.0	amp

Direct Interelectrode Capacitance:

Grid to Anode (Approx.) .	4.4	μf
Peak Voltage Drop (Approx.)	16	volts

Approximate Control Characteristics:

Anode Voltage . .	40	100	1000		volts
Grid Voltage . .	0	-2.25	-6.5		volts
Ionization Time (Approx.)	10	microseconds			
Deionization Time (Approx.)	1000	microseconds			

Mechanical:

Mounting Position	Vertical, base down
Overall Length.	6-3/8" ± 1/4"
Seated Length.	5-3/4" ± 1/4"
Maximum Diameter.	2-7/16"
Bulb.	S-19
Cap	Medium
Base.	Medium 4-Pin, Bayonet

Maximum Ratings, Absolute Values:

PEAK FORWARD ANODE VOLTAGE.	2500 max.	volts
PEAK INVERSE ANODE VOLTAGE.	5000 max.	volts
GRID VOLTAGE:		
Before Conduction	-500 max.	volts
During Conduction	-10 max.	volts
INSTANTANEOUS ANODE CURRENT:		
Below 25 Cycles	1.0 max.	amp
25 Cycles and Higher.	2.0 max.	amp
AVERAGE ANODE CURRENT**	0.5 max.	amp
SURGE ANODE CURRENT for 0.1 sec. max. .	40 max.	amp
INSTANTANEOUS GRID CURRENT.	0.25 max.	amp
AVERAGE GRID CURRENT**	0.05 max.	amp
COND.-MERCURY TEMP. RANGE [▲]	40 to 80	°C

* Filament voltage must be applied at least 5 seconds before anode voltage is applied.

** Averaged over any 15-second interval.

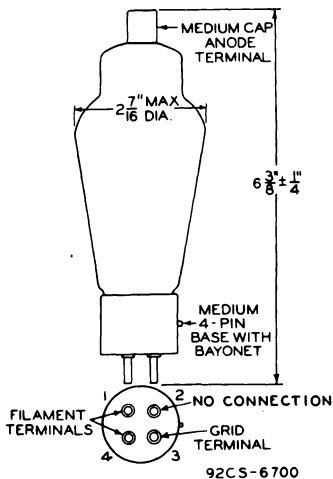
[▲] Recommended condensed-mercury temperature 40°C.

5557

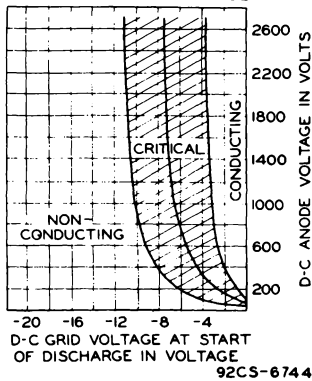


5557

THYRATRON



OPERATIONAL REGION OF CRITICAL GRID VOLTAGE





5559

5559

THYRATRON

MERCURY-VAPOR TRIODE

DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage.	5.0	volts
Current.	4.5	amp

Cathode:

Minimum Heating Time, prior to tube conduction	5	minutes
--	---	---------

Direct Interelectrode Capacitances (Approx.):

Grid to Anode.	2.5	μ mf
Grid to Cathode.	10	μ mf

Ionization Time (Approx.). 10 μ secDeionization Time (Approx.) 1000 μ sec

Anode Voltage Drop (Approx.) 16 volts

Grid-No.1 Control Ratio (Approx.) with grid-No.1 resistor (megohms) = 0 220

Mechanical:

Mounting Position. Vertical, Base Down

Overall Length 7" $\pm$ 1/4"Seated Length. 6-3/8" $\pm$ 1/4"

Maximum Diameter 3"

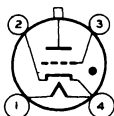
Bulb ST-23

Cap. Medium

Base Medium-Shell Small 4-Pin, Bayonet

Basing Designation for BOTTOM VIEW 4BL

Pin 1-Heater

Pin 2-Cathode;
Circuit
Returns

Pin 3-Grid

Pin 4-Heater,
Cathode
Cap-Anode

Maximum Ratings, Absolute Values:

PEAK ANODE VOLTAGE:

Forward.	1000 max.	volts
Inverse.	1000 max.	volts

GRID VOLTAGE:

Before Conduction.	-500 max.	volts
During Conduction.	-10 max.	volts

CATHODE CURRENT:

Peak	15 max.	amp
Average**.	2.5 max.	amp
Fault, for 0.1 sec. maximum.	200 max.	amp

GRID CURRENT:

Average**.	+0.25 max.	amp
--------------------	------------	-----

COND.-MERCURY TEMPERATURE RANGE[▲] +40 to +80 °C

OPERATING FREQUENCY. 150 max. cps

** Averaged over any interval of 15 sec. max.

▲ Recommended operating temperature is 40°C.

← Indicates a change.

MARCH 1, 1951

TUBE DEPARTMENT

DATA

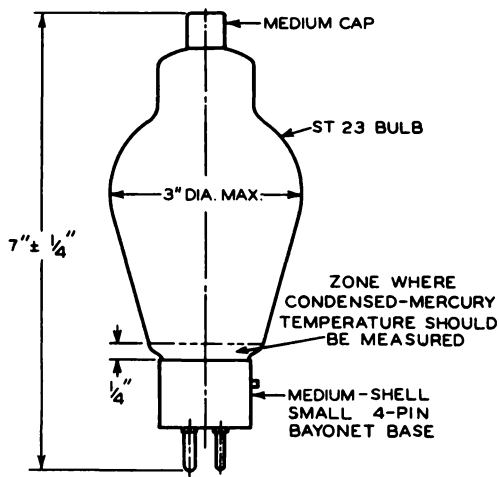
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5559



5559

THYRATRON



92CS-6743RI



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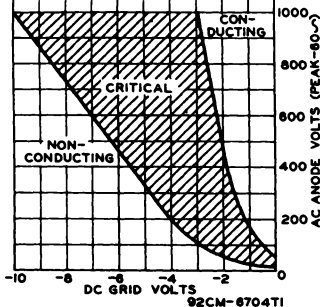
5559

THYRATRON

OPERATIONAL RANGE
OF CRITICAL GRID VOLTAGE

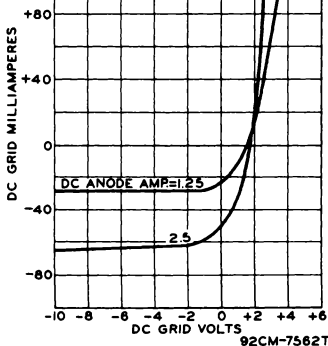
TYPE 5559

RANGE IS FOR CONDITIONS WHERE:
 $E_f = 5$ VOLTS AC $\pm 5\%$; CIRCUIT RETURNS
TO PIN N ϕ 2. THE RANGE INCLUDES
INITIAL & LIFE VARIATIONS OF INDIVIDUAL
TUBES, AS WELL AS CHANGE IN CHAR-
ACTERISTICS DUE TO HEATER PHASING.
GRID RESISTOR (OHMS) = 0
COND-MERCURY TEMPERATURE = 40°C

AVERAGE GRID CHARACTERISTICS
DURING ANODE CONDUCTION

TYPE 5559

$E_f = 5$ VOLTS AC
CIRCUIT RETURNS TO PIN N ϕ 2
GRID RESISTOR (OHMS) = 0
CONDENSED-MERCURY TEMPERATURE = 80°C



5559



5559

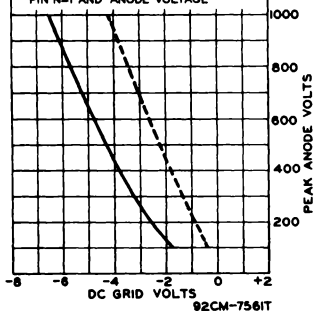
THYRATRON

SHIFT OF AVERAGE CONTROL CHARACTERISTIC WITH CHANGE IN HEATER PHASING

TYPE 5559 $E_f = 5$ VOLTS AC
CONDENSED-MERCURY TEMPERATURE = 40°C
GRID RESISTOR (OHMS) = 0

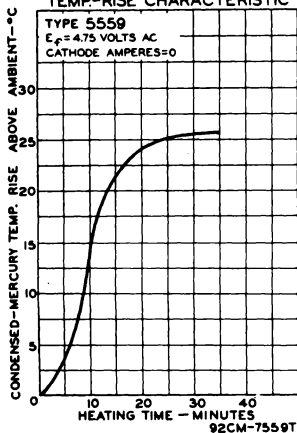
CURVE	PHASE ANGLE DEGREES °	CIRCUIT RETURN
—	180°	PIN NR2
- - -	0°	PIN NR2

* BETWEEN HEATER VOLTAGE AT
PIN NR1 AND ANODE VOLTAGE



TEMP.-RISE CHARACTERISTIC

TYPE 5559
 $E_f = 4.75$ VOLTS AC
CATHODE AMPERES = 0



MARCH 1, 1951

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-7561T-7559T



5560

5560

THYRATRON

MERCURY-VAPOR TETRODE

DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage. 5.5[□] 5.0 voltsCurrent. 5.0[□] 4.5 amp

Cathode:

Minimum Heating Time, prior
to tube conduction . . . 5 minutes

Direct Interelectrode Capacitances (Approx.):

Grid No.1 to Anode . . . 0.2 μ fGrid No.1 to Cathode . . . 4.4 μ f ←Ionization Time (Approx.). . 10 μ secDeionization Time (Approx.) 1000 μ sec

Anode Voltage Drop (Approx.) 16 volts

Grid-No.1 Control Ratio (Approx.) with grid-No.1
resistor (ohms) = 0; grid-No.1 and grid-No.2 volts = 0 . . . 170 ←Grid-No.2 Control Ratio (Approx.) with grid-No.1
resistor (ohms) = 0; grid-No.1 and grid-No.2 volts = 0 . . . 300 ←

Mechanical:

Mounting Position. Vertical, Base Down

Overall Length 7-11/16" $\pm$ 1/4"Seated Length. 7-1/16" $\pm$ 1/4" ←

Greatest Radius. 2-1/4"

Bulb ST-23

Caps (Two) Medium

Base Medium-Shell Small 4-Pin, Bayonet

Basing Designation for BOTTOM VIEW 4CD

Pin 1-Heater

Pin 2-Cathode;
Circuit
Returns

Pin 3-Grid No.2

Pin 4-Heater,
Cathode

Top Cap-Anode

Side Cap-Grid No.1

Maximum Ratings, Absolute Values:

PEAK ANODE VOLTAGE:

Forward. 1000 max. volts

Inverse. 1000 max. volts

GRID-No.2 (SHIELD-GRID) VOLTAGE:

Before Conduction. -300 max. volts

During Conduction. -5 max. volts

GRID-No.1 (CONTROL-GRID) VOLTAGE:

Before Conduction. -1000 max. volts

During Conduction. -10 max. volts ←

CATHODE CURRENT:

Peak 30 max.[□] 15 max. ampAverage** 0.5 max.[□] 2.5 max. amp

Fault, for 0.1 sec. maximum. 200 max. amp

□ **: See next page.

← Indicates a change.

MARCH 1, 1951

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA

5560



5560

THYRATRON

GRID-No.2 CURRENT:

Average** 0.25 max. amp

GRID No.1 CURRENT:

Average** 0.25 max. amp

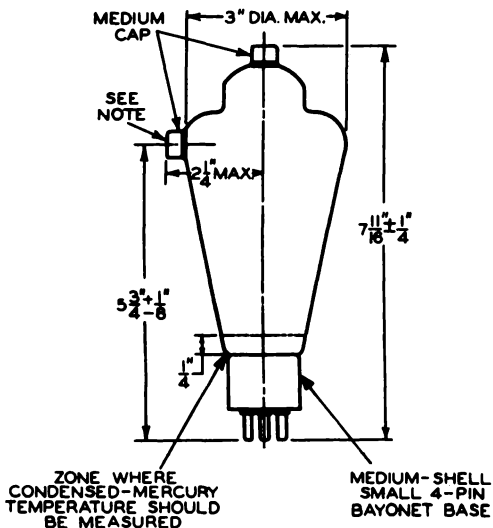
COND.-MERCURY TEMPERATURE RANGE[▲] +40 to +80 °C

OPERATING FREQUENCY. 150 max. cps

□ Applies when this tube is used for ignitor firing.

** Averaged over any interval of 15 sec. max.

▲ Recommended operating temperature is 40°C.



92CS-6742R1

NOTE: THE PLANE THROUGH TUBE AXIS AND CENTER OF GRID-No.1 CAP IS $45^\circ \pm 5^\circ$ FROM THE PLANE THROUGH THE TUBE AXIS AND CENTER OF BAYONET PIN. GRID-No.1 CAP IS ON SAME SIDE AS PIN No.3.

TEMPERATURE-RISE CHARACTERISTIC of the 5560
is the same as that shown for Type 5559



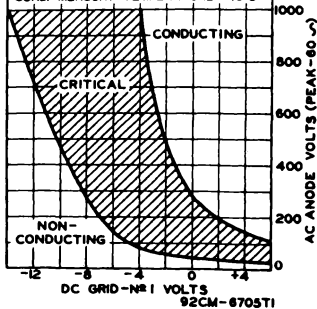
5560

THYRATRON

5560

OPERATIONAL RANGE OF CRITICAL GRID VOLTAGE

TYPE 5560
RANGE IS FOR CONDITIONS WHERE:
 $E_f = 5$ VOLTS AC $\pm 5\%$; GRID-NR 2 (SHIELD)
VOLTS = 0; CIRCUIT RETURNS TO PIN NR
2. THE RANGE INCLUDES INITIAL AND
LIFE VARIATIONS OF INDIVIDUAL TUBES,
AS WELL AS CHANGE IN CHARACTERIS-
TICS DUE TO HEATER PHASING.
GRID-NR 1 RESISTOR (OHMS) = 0
COND.-MERCURY TEMPERATURE = 40°C

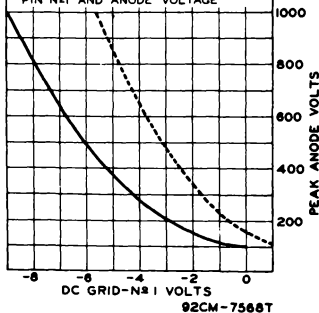


SHIFT OF AVERAGE CONTROL CHARACTERISTIC WITH CHANGE IN HEATER PHASING

TYPE 5560 $E_f = 5$ VOLTS AC
GRID-NR 2 (SHIELD) VOLTS = 0
CONDENSED-MERCURY TEMPERATURE: 40°C
GRID-NR 1 RESISTOR (OHMS) = 0

CURVE	PHASE ANGLE DEGREES *	CIRCUIT RETURN
---	180°	PIN NR 2
---	0°	PIN NR 2

* BETWEEN HEATER VOLTAGE AT
PIN NR 1 AND ANODE VOLTAGE



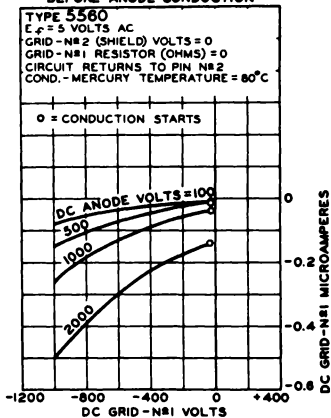
5560



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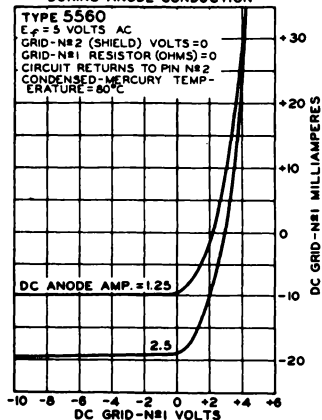
THYRATRON

AVERAGE GRID CHARACTERISTICS BEFORE ANODE CONDUCTION



92CM-7556T

AVERAGE GRID CHARACTERISTICS DURING ANODE CONDUCTION



92CM-7570T

MARCH 1, 1951

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-7556T-7570T



5563

THYRATRON

MERCURY-VAPOR TRIODE

5563

GENERAL DATA**Electrical:**

Filament, Coated:

Voltage. 5 volts

Current. 10 amp

Minimum Heating Time:

At initial installation without anode voltage, for proper distribution of condensed mercury 15 minutes

During subsequent operation and prior to conduction, for bringing condensed-mercury temperature within operating range. } { Not less than 60 seconds to provide adequate filament heating; longer, if required by low ambient temperatures.

Direct Interelectrode Capacitances:⁰Grid to Anode. 10 max. μ fGrid to Cathode. 20 max. μ fIonization Time. 10 approx. μ secondsDeionization Time 1000 approx. μ seconds

Anode Voltage Drop 15 approx. volts

Grid Control Ratio[▲] 200 approx.⁰ With no external shield.**Mechanical:**

Mounting Position. Vertical, base down

Overall Length 10-1/8" to 11-1/16"

Maximum Diameter 3-7/8"

Cooling. Convection

Bulb T-24

Cap Skirted Medium No. 3985

Base Medium-Metal-Shell Jumbo 4-Pin, Bayonet

BOTTOM VIEWPin 1-Grid
Pin 2-Filament,
Internal
ShieldPin 3-No
Connection
Pin 4-Filament
Cap - Anode**Maximum Ratings, Absolute Values:***For Anode-Supply Frequencies between 25 and 150 cps*COND. MERCURY TEMP. RANGE[□] 25-55 25-50 °C

PEAK ANODE VOLTAGE:

Forward. 10000 max. 15000 max. volts

Inverse. 10000 max. 15000 max. volts

GRID VOLTAGE:

Before Anode

Conduction (Peak or DC) -500 max. -500 max. volts

During Anode

Conduction (Average)[●] -10 max. -10 max. volts[▲], [□], [●]: See next page.

JUNE 20, 1947

TUBE DEPARTMENT

TENTATIVE DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5563



5563 THYRATRON

CATHODE CURRENT:

Peak	10 max.	6.4 max.	amp
Average	1.8 max.	1.6 max.	amp
Surge, for max. duration of 0.1 second . . .	200 max.	200 max.	amp
Averaging Time	1	1	cycle

GRID CURRENT:

Peak	+1 max.	+1 max.	amp
Average	+0.1 max.	+0.1 max.	amp
Averaging Time	1	1	cycle

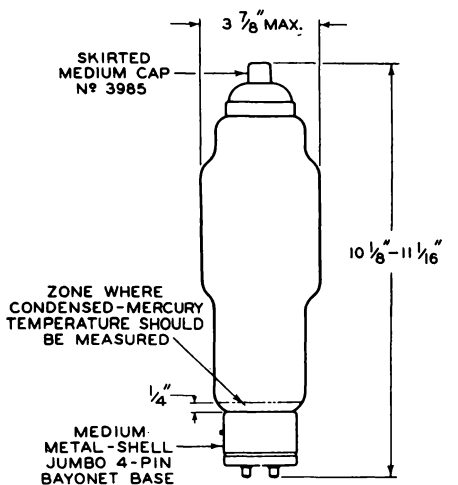
Maximum Circuit Values:

Grid-Circuit Resistance. . .	0.1 max.	0.1 max. megohm
------------------------------	----------	-----------------

▲ For conditions with 0.1-megohm grid resistor, circuit returns to pin No. 2 as datum of potential, and filament voltage at pin No. 4 180° out of phase with the anode voltage.

□ Recommended operating value is $40^{\circ} \pm 5^{\circ}\text{C}$.

● Averaged over one conducting cycle.



92CS-6832



5563

THYRATRON

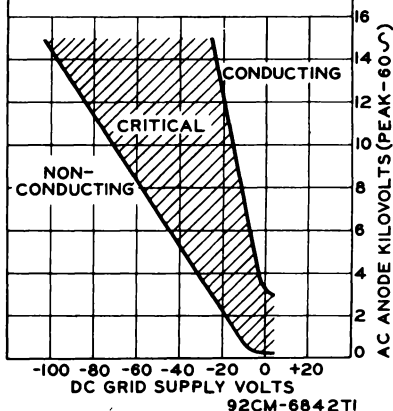
5563

OPERATIONAL RANGE OF CRITICAL GRID VOLTAGE

TYPE 5563

RANGE IS FOR CONDITIONS WHERE:

$E_f = 5$ VOLTS AC $\pm 5\%$; CIRCUIT RETURNS TO
PIN N°2; FIL. VOLTAGE AT PIN N°4 IS (-) WHEN
ANODE VOLTAGE IS (+). THE RANGE INCLUDES
INITIAL & LIFE VARIATIONS OF INDIVIDUAL
TUBES. GRID RESISTOR = 10000 TO 100000
OHMS. COND. MERCURY TEMPERATURE =
25° TO 50°C.



5563



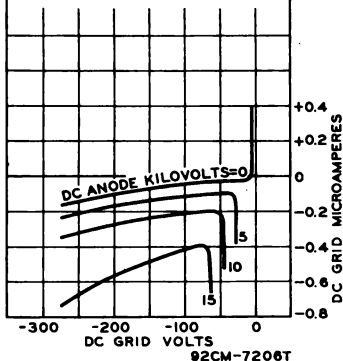
5563

THYRATRON

AVERAGE GRID CHARACTERISTICS
BEFORE ANODE CONDUCTION

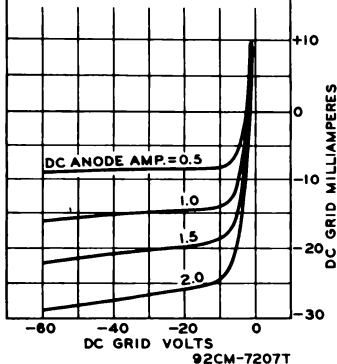
TYPE 5563

$E_f = 5$ VOLTS AC; CIRCUIT RETURNS TO
PIN N#2; FILAMENT VOLTAGE AT PIN
N#4 IS (+) WHEN ANODE VOLTAGE IS (+);
GRID RESISTOR (OHMS) = 0; CONDENSED-
MERCURY TEMPERATURE = 46°C .

AVERAGE GRID CHARACTERISTICS
DURING ANODE CONDUCTION

TYPE 5563

$E_f = 5$ VOLTS AC; CIRCUIT RETURNS TO
PIN N#2; FILAMENT VOLTAGE AT PIN
N#4 IS (+) WHEN ANODE VOLTAGE IS (+);
GRID RESISTOR (OHMS) = 0; CONDENSED-
MERCURY TEMPERATURE = 46°C .



SEPT. 15, 1949

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-7206T-7207T



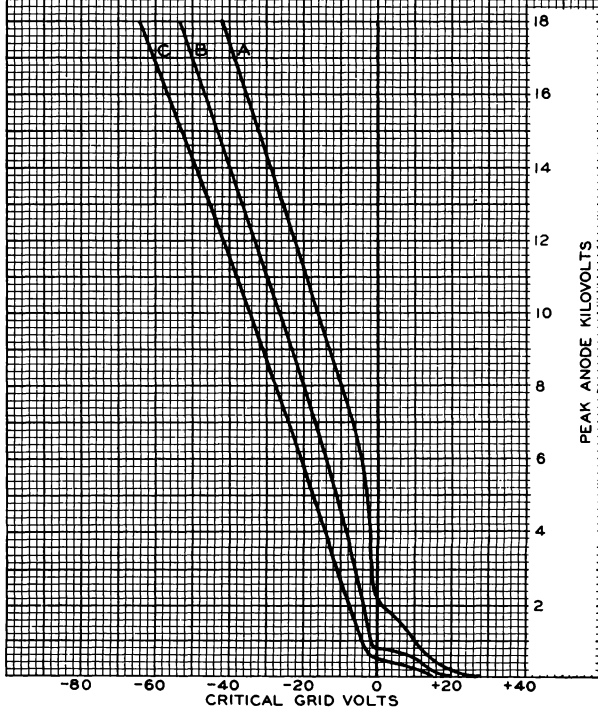
5563

5563

AVERAGE CONTROL CHARACTERISTICS

$E_f = 5$ VOLTS AC
CIRCUIT RETURNS TO PIN №2.
FILAMENT VOLTAGE AT PIN №4
IS (+) WHEN ANODE VOLTAGE IS (+).
GRID RESISTOR = 25000 OHMS.

CURVE	CONDENSED MERCURY TEMPERATURE
A	25°C
B	40°C
C	55°C



5563



5563

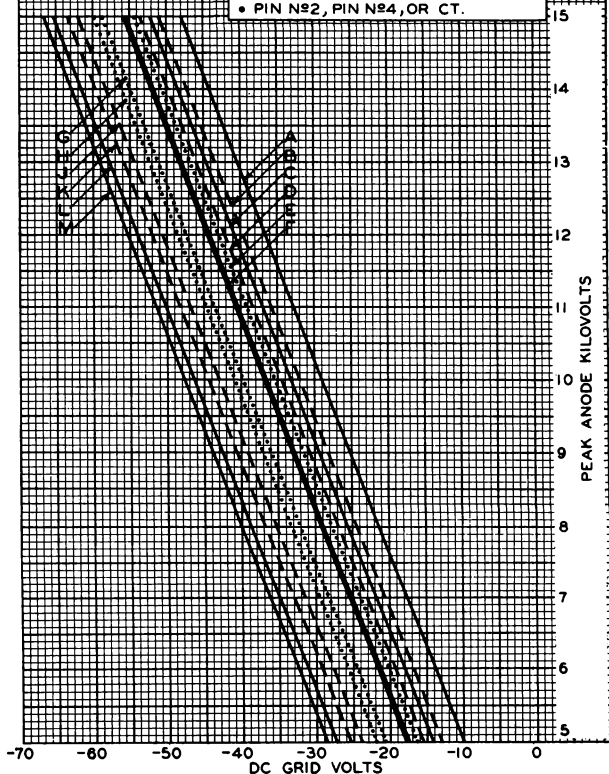
SHIFT OF AVERAGE CONTROL CHARACTERISTICS WITH CHANGE IN FILAMENT PHASING AND CIRCUIT RETURN

$E_f = 5$ VOLTS AC					
CURVE	PHASE ANGLE DEGREES*	CIRCUIT RETURN	CURVE	PHASE ANGLE DEGREES*	CIRCUIT RETURN
A ———	0	PIN N ^o 2	G 135	135	PIN N ^o 4
B - - -	0	CT ^o	H 180	180	PIN N ^o 4
C ———	45	PIN N ^o 2	J - - -	135	CT ^o
D - - -	45	CT ^o	K - - -	180	CT ^o
E 0	0	PIN N ^o 4	L ———	135	PIN N ^o 2
F ———	90	ANY ^o	M ———	180	PIN N ^o 2

* BETWEEN FILAMENT VOLTAGE AT
PIN N^o4 AND ANODE VOLTAGE

• CENTER TAP OF FILAMENT
TRANSFORMER

• PIN N^o2, PIN N^o4, OR CT.

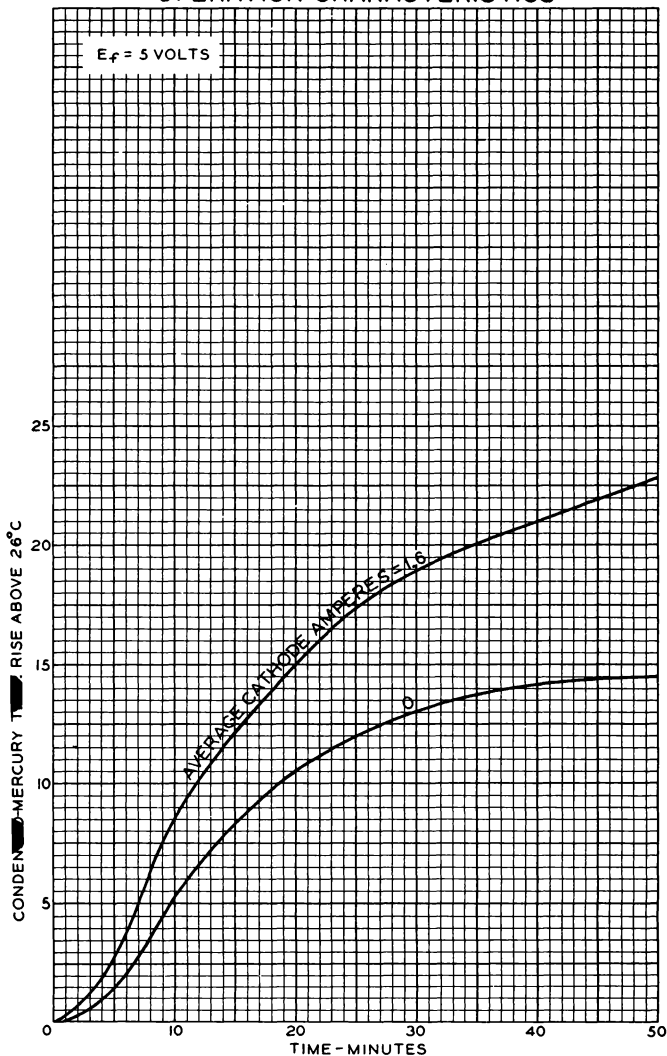




5563

5563

OPERATION CHARACTERISTICS



MAY 4, 1949

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7267



5563-A

5563-A

MERCURY-VAPOR THYRATRON

NEGATIVE-CONTROL TRIODE TYPE

Supersedes Type 5563

GENERAL DATA**Electrical:**

Filamentary Cathode, Coated:

	Min.	Av.	Max.	
Voltage.	4.75	5	5.25	volts
Current at 5 volts	-	10	11	amp

Minimum Heating Time:

On initial installation, with no voltage on grid or anode, for redistribution of mercury to lower part of tube.	15	minutes
During subsequent operation, to allow filament to reach operating temperature prior to tube conduction	1	minute

Direct Interelectrode Capacitances:⁰

Grid to anode.	4	μ f
Grid to cathode.	16	μ f

Ionization Time (Approx.). 10 μ secDeionization Time (Approx.). 1000 μ secMaximum Critical Grid Current for instantaneous anode volts = 20000 50 μ amp

Anode Voltage Drop (Approx.). 15 volts

Grid Control Ratio (Approx.):

Under conditions: 10000-ohm grid resistor,
circuit returns to pin 2, filament voltage
at pin 4 out of phase with anode voltage
by 180°, and condensed-mercury temperature
of 40°C. 275

Mechanical:

Operating Position Vertical, base down

Overall Length 10-3/32" $\pm$ 7/16"

Maximum Diameter 2-7/8"

Bulb T-29

Weight (Approx.) 13 oz

Cap. Medium (JETEC No.C1-5)

Base Skirted Medium-Metal-Shell Jumbo 4-Pin,
with Bayonet (JETEC No.A4-69)**BOTTOM VIEW**

Pin 1 - Grid
Pin 2 - Filament
Internal
Shield,
Circuit
Returns



Pin 3 - No Connec-
tion—Do Not
Use
Pin 4 - Filament
Cap - Anode

⁰ Without external shield.

5563-A



5563-A

MERCURY-VAPOR THYRATRON

Temperature Control:

Heating--When the ambient temperature is so low that the normal rise of condensed-mercury temperature above the ambient temperature will not bring the condensed-mercury temperature up to the minimum value of the operating range specified under *Maximum Ratings*, some form of heat-conserving enclosure or auxiliary heater will be required.

Cooling--When the operating conditions are such that the maximum value of the operating condensed-mercury temperature for the applicable service rating is exceeded, provision should be made for forced-air cooling sufficient to prevent exceeding the maximum value.

Temperature Rise of Condensed Mercury to
Equilibrium Above Ambient Temperature
(Approx.):*

No Load	13	°C
Full Load	17	°C

CONTROL SERVICE--In-Phase Operation*

Maximum Ratings, Absolute Values:

For supply frequency of 25 to 60 cps

Operating Condensed-Mercury
Temperature Range
25° to 55°C 25° to 50°C

PEAK ANODE VOLTAGE:

Forward	15000 max.	20000 max.	volts
Inverse	15000 max.	20000 max.	volts

GRID VOLTAGE:

Peak or DC, before tube conduction	-500 max.	-500 max.	volts
Average [▲] , during tube conduction	-10 max.	-10 max.	volts

ANODE CURRENT:

Peak	10 max.	6.4 max.	amp
Average ^{●●}	1.8 max.	1.6 max.	amp
Fault, for duration of 0.1 second maximum	50 max.	50 max.	amp

GRID CURRENT:

Average positive [⊙]	100 max.	100 max.	ma
Peak positive with anode negative	5 max.	5 max.	ma

Maximum Circuit Values:

Grid-Circuit Resistance	0.1 max.	0.1 max.	megohm
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* With filament voltage = 4.75 volts and no heat-conserving enclosure.

- Filament voltage has a phase angle of either 0° or 180° with respect to the anode voltage.

▲, ●●, ⊙: see next page.



5563-A

5563-A

MERCURY-VAPOR THYRATRON

CONTROL SERVICE--Quadrature Operation^{oo}

Maximum Ratings, Absolute Values:

For supply frequency of 25 to 60 cps

Operating Condensed-Mercury
Temperature Range
25° to 55°C 25° to 50°C

PEAK ANODE VOLTAGE:

Forward.	15000 max.	20000 max.	volts
Inverse.	15000 max.	20000 max.	volts

GRID VOLTAGE:

Peak or DC, before tube conduction.	-500 max.	-500 max.	volts
Average [▲] , during tube conduction.	-10 max.	-10 max.	volts

ANODE CURRENT:

Peak	11.5 max.	11.5 max.	amp
Average ^{●●}	2.5 max.	2.5 max.	amp
Fault, for duration of 0.1 second maximum	50 max.	50 max.	amp

GRID CURRENT:

Average positive [⊙]	100 max.	100 max.	ma
Peak positive with anode negative	5 max.	5 max.	ma

Maximum Circuit Values:

Grid-Circuit Resistance. . . .	0.1 max.	0.1 max.	megohm
--------------------------------	----------	----------	--------

[▲] Averaged over one conducting period.^{●●} Averaged over one cycle of power-supply frequency.[⊙] Averaged over period of grid conduction.^{oo} Filament voltage is 60° to 120° out of phase (leading or lagging) with the anode voltage.

OPERATING CONSIDERATIONS

X-rays are produced when the 5563-A is operated with a peak inverse anode voltage above 16000 volts (absolute value). These rays can constitute a health hazard unless the tube is adequately shielded for X-ray radiation. Although relatively simple shielding should prove adequate, make sure it provides the required protection to the operator.



GRID-CONTROLLED RECTIFIER CIRCUITS

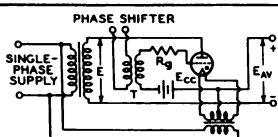


FIG. 1 HALF-WAVE SINGLE-PHASE

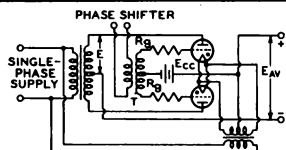


FIG. 2 FULL-WAVE SINGLE-PHASE

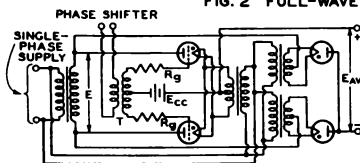


FIG. 3 SERIES SINGLE-PHASE

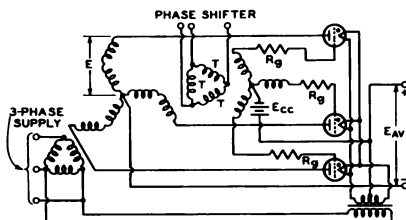


FIG. 4 HALF-WAVE THREE-PHASE

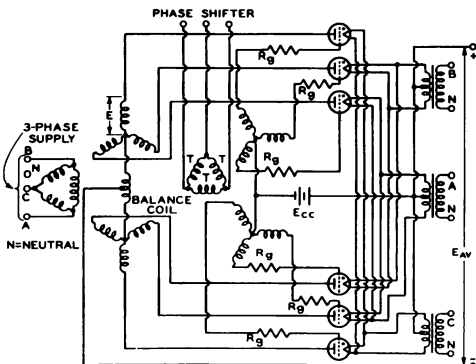


FIG. 5 PARALLEL THREE-PHASE (QUADRATURE OPERATION)

Devices and arrangements shown or described herein may use patents of RCA or others. Information contained herein is furnished without responsibility by RCA for its use and without prejudice to RCA's patent rights.



5563-A

5563-A

GRID-CONTROLLED RECTIFIER CIRCUITS

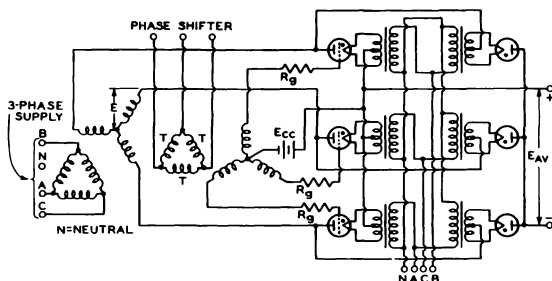


FIG. 6 SERIES THREE-PHASE (QUADRATURE OPERATION)

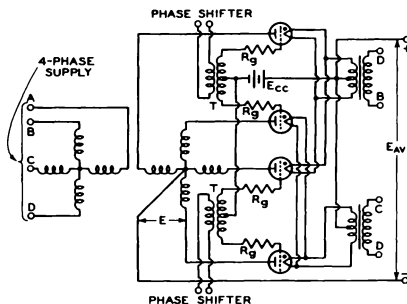


FIG. 7 HALF-WAVE FOUR-PHASE (QUADRATURE OPERATION)

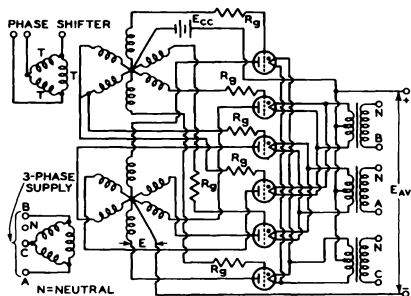


FIG. 8 HALF-WAVE SIX-PHASE (QUADRATURE OPERATION)

NOTES

T = PEAKING TRANSFORMER

IN FIGS. 3 AND 6, THE RECTIFIER TUBES MAY BE EITHER 869-B₃ OR 5563-A₃ USED AS DIODES. THE 5563-A IS USED AS A DIODE BY CONNECTING GRID TO PIN 2.

92CL-8340

JAN. 3, 1955

TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA 3



5563-A

GRID-CONTROLLED RECTIFIER CIRCUITS

Numerical Relationships Among Electrical Quantities

E = Trans. Sec. Voltage (RMS)	I_{av} = Average DC Output Current
E_{av} = Average DC Output Voltage	I_b = Average Anode Current
E_{bmi} = Peak Inverse Anode Voltage	I_p = Anode Current (RMS)
E_m = Peak DC Output Voltage	I_{pm} = Peak Anode Current
E_r = Major Ripple Voltage (RMS)	P_{al} = Line Volt-Amperes
f = Supply Frequency	P_{ap} = Trans. Pri. Volt-Amperes
f_r = Major Ripple Frequency	P_{as} = Trans. Sec. Volt-Amperes
P_{dc} = DC Power ($E_{av} \times I_{av}$)	

Note: Conditions assumed involve sine-wave supply; zero voltage drop in tubes; no losses in transformer and circuit; no back emf in the load circuit; and no phase-back.

RATIO	Fig. 1	Fig. 2	Fig. 3	Fig. 4	Fig. 5*	Fig. 6	Fig. 7	Fig. 8
Voltage Ratios								
E/E_{av}	2.22	1.11	1.11	0.854	0.854	0.427	0.785	0.74
E_{bmi}/E	1.41	2.83	1.41	2.45	2.45	2.45	2.83	2.83
E_{bmi}/E_{av}	3.14	3.14	1.57	2.09	2.09	1.05	2.22	2.09
E_m/E_{av}	3.14	1.57	1.57	1.21	1.05	1.05	1.11	1.05
E_r/E_{av}	1.11	0.472	0.472	0.177	0.04	0.04	0.106	0.04
Frequency Ratio								
f_r/f	1	2	2	3	6	6	4	6
Current Ratios								
I_p/I_{av}	1.57	0.785	0.785	0.578	0.289	0.578	0.5	0.408
I_b/I_{av}	1	0.5	0.5	0.33	0.167	0.33	0.25	0.167
Resistive Load								
I_{pm}/I_{av}	3.14	1.57	1.57	1.21	0.52	1.05	1.11	1.05
I_{pm}/I_b	3.14	3.14	3.14	3.63	3.14	3.14	4.5	6.3
Inductive Load [■]								
I_{pm}/I_{av}	—	1	1	1	0.5	1	1	1
Power Ratios								
Resistive Load								
P_{as}/P_{dc}	3.49	1.74	1.24	—	—	—	—	—
P_{ap}/P_{dc}	2.69	1.23	1.24	—	—	—	—	—
P_{al}/P_{dc}	2.69	1.23	1.24	—	—	—	—	—
Inductive Load [■]								
P_{as}/P_{dc}	—	1.57	1.11	1.71	1.48	1.05	1.57	1.81
P_{ap}/P_{dc}	—	1.11	1.11	1.21	1.05	1.05	1.11	1.29
P_{al}/P_{dc}	—	1.11	1.11	1.21	1.05	1.05	1.11	1.05

* Bleeder current of 2% full-load current will provide exciting current for balance coil and thus avoid poor regulation at light loading.

■ The use of a large filter-input choke is assumed.



5563-A

5563-A

MERCURY-VAPOR THYRATRON

CIRCUIT	MAX. TRANS. SEC. VOLTS (RMS) E	APPROX. DC OUTPUT VOLTS TO FILTER E _{av}	MAX. DC OUTPUT AMPERES I _{av}	MAX. DC OUTPUT KW TO FILTER P _{dc}		
Fig. 1 Half-Wave Single-Phase In-Phase Operation	14000 [□] 10600 [▲]	6300 4700	1.6 1.8	10 8.5		
Fig. 2 Full-Wave Single-Phase In-Phase Operation	7000 [□] 5300 [▲]	6300 4700	3.2 3.6	20 17		
Fig. 3 Series Single-Phase In-Phase Operation	14000 [□] 10600 [▲]	12700 9500	3.2 3.6	40 34		
Fig. 4 Half-Wave Three-Phase In-Phase Operation	8100 [□] 6100 [▲]	9500 7100	4.8 5.4	45 38		
Fig. 5 Parallel Three-Phase Quadrature Operation	8100 [□] 6100 [▲]	9500 7100	15.0 15.0	143 106		
Fig. 6 Series Three-Phase Quadrature Operation	8100 [□] 6100 [▲]	19000 14200	7.5 7.5	143 106		
Fig. 7 Half-Wave Four-Phase Quadrature Operation	7000 [□] 5300	9000 6700	Resis- tive Load 10.0 10.0	Induc- tive Load 10.0 10.0	Resis- tive Load 90 67	Induc- tive Load 90 67
Fig. 8 Half-Wave Six-Phase Quadrature Operation	7000 [□] 5300 [▲]	9500 7100	Resis- tive Load 11.0 11.0	Induc- tive Load 11.5 11.5	Resis- tive Load 105 78	Induc- tive Load 110 81

□ For maximum peak inverse anode voltage of 20000 volts, and condensed-mercury temperature range of 25° to 50°C.

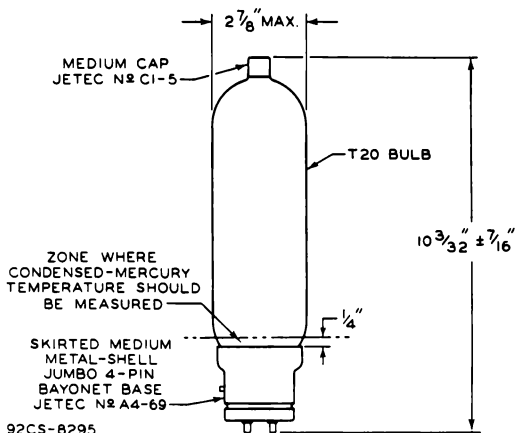
▲ For maximum peak inverse anode voltage of 15000 volts, and condensed-mercury temperature range of 25° to 55°C.

5563-A

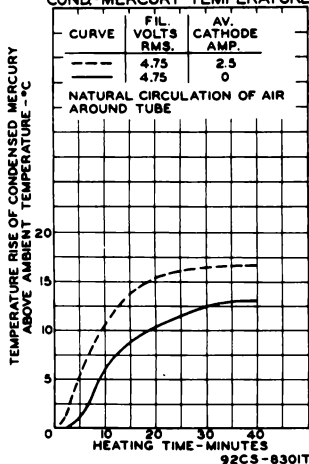


5563-A

MERCURY-VAPOR THYRATRON



RATE OF RISE OF
COND-MERCURY TEMPERATURE



JAN. 3, 1955

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-8295
-8301T



5563-A

5563-A OPERATIONAL RANGE OF CRITICAL GRID VOLTAGE

RANGE IS FOR CONDITIONS WHERE:

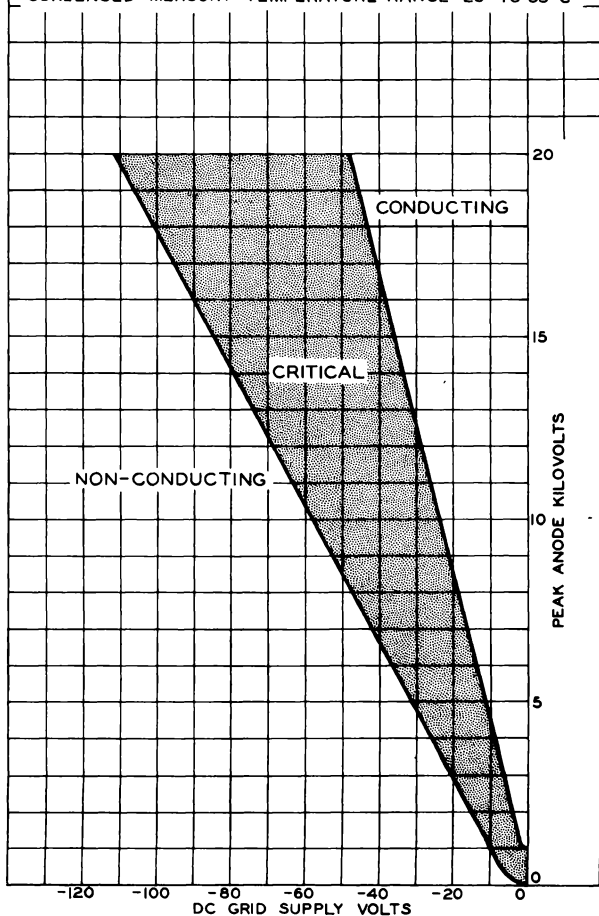
$E_f = 5.0$ VOLTS AC $\pm 5\%$; CIRCUIT RETURNS TO PIN 2.

FILAMENT VOLTAGE AT PIN 4 IS (-) WHEN ANODE VOLTAGE IS (+).

THE RANGE INCLUDES INITIAL AND LIFE VARIATIONS OF INDIVIDUAL TUBES.

GRID RESISTOR = 10000 TO 100000 OHMS

CONDENSED-MERCURY TEMPERATURE RANGE = 25° TO 55° C



APR. 8, 1954

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RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

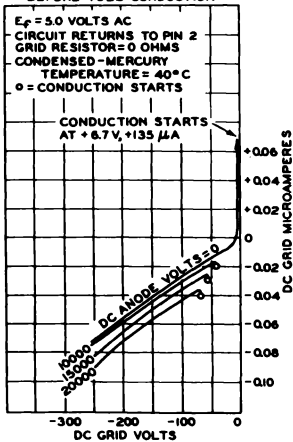
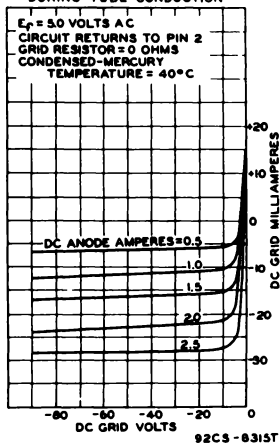
92CM-8302

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CHARACTERISTIC CURVES

AVERAGE GRID
CHARACTERISTICS
BEFORE TUBE CONDUCTIONAVERAGE GRID
CHARACTERISTICS
DURING TUBE CONDUCTION

JAN. 3, 1955

 TUBE DIVISION
 RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

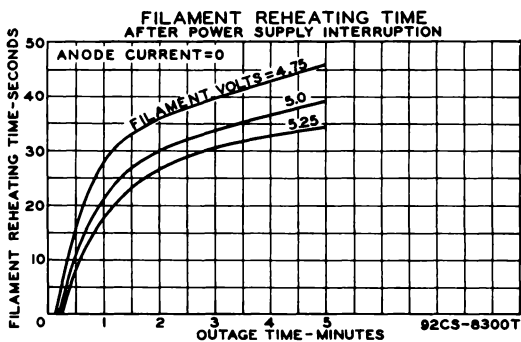
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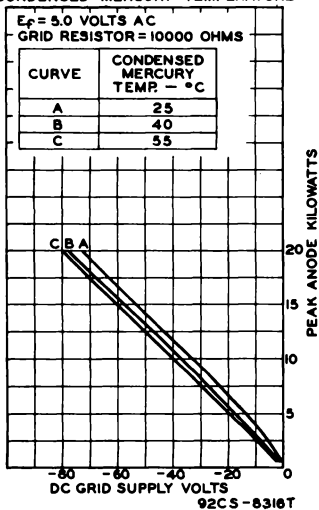
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5563-A

CHARACTERISTIC CURVES



SHIFT OF AVERAGE
CONTROL CHARACTERISTIC
WITH CHANGE IN
CONDENSED-MERCURY TEMPERATURE



5563-A



5563-A

SHIFT OF AVERAGE CONTROL CHARACTERISTICS WITH CHANGE IN FILAMENT PHASING AND CIRCUIT RETURN

 $E_f = 5.0$ VOLTS AC

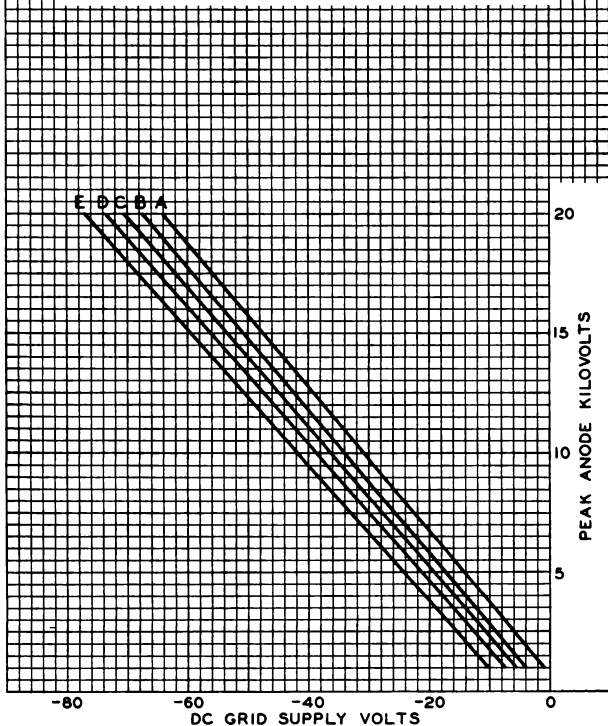
GRID RESISTOR=10000 OHMS

CONDENSED-MERCURY TEMPERATURE=40°C

CURVE	PHASE ANGLE*	CIRCUIT RETURN
A	0°	PIN 2
B	0°	CT [□]
C	0°, 180° 90°	PIN 4 ANY •
D	180°	CT [□]
E	180°	PIN 2

*BETWEEN FILAMENT VOLTAGE AT PIN 4 AND
ANODE VOLTAGE[□] CENTER TAP OF FILAMENT TRANSFORMER

• PIN 2, PIN 4, OR CT



APRIL 12, 1954

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RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8309



5563-A

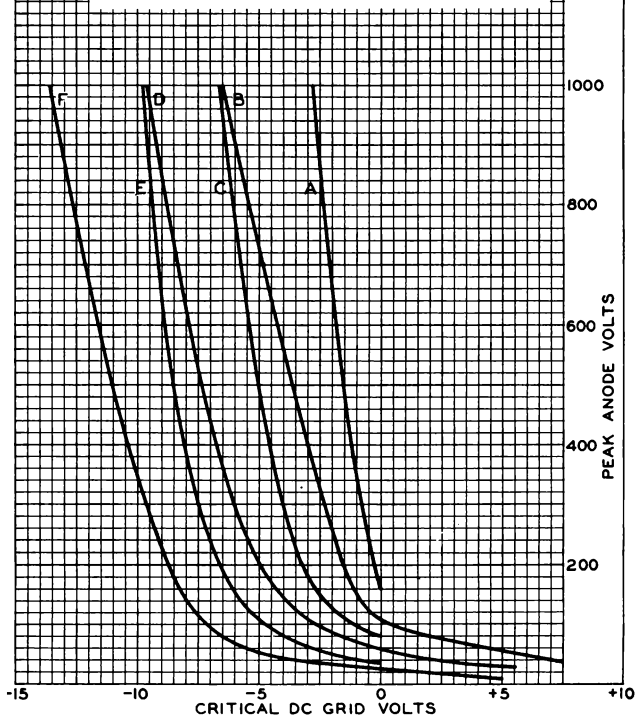
5563-A SHIFT OF AVERAGE CONTROL CHARACTERISTICS WITH CHANGE IN FILAMENT PHASING AND CIRCUIT RETURN AT LOW ANODE VOLTAGES

$E_f = 5.0$ VOLTS AC
GRID RESISTOR = 10000 OHMS
CONDENSED-MERCURY TEMPERATURE = 40°C

CURVE	PHASE ANGLE *	CIRCUIT RETURN
A	0°	PIN 2
B	180°	PIN 4
C	0°	CT $\square$
D	180°	CT $\square$
E	0°	PIN 4
F	180°	PIN 2

* BETWEEN FILAMENT VOLTAGE AT PIN 4 AND
ANODE VOLTAGE

$\square$ CENTER TAP OF FILAMENT TRANSFORMER



5563-A



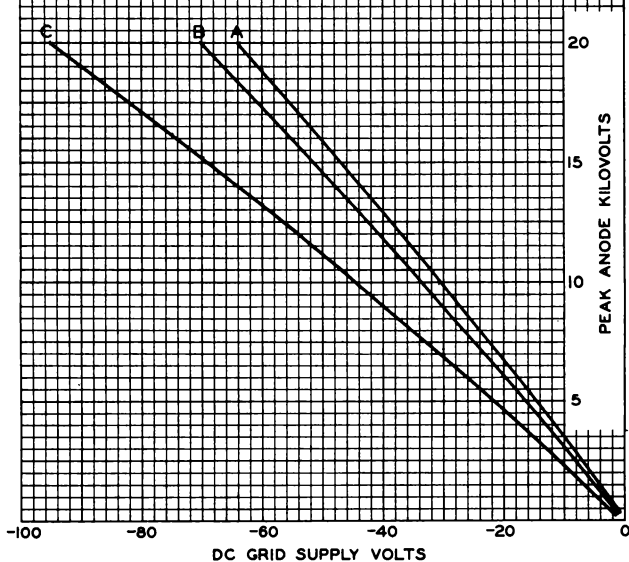
5563-A

SHIFT OF AVERAGE CONTROL CHARACTERISTICS WITH CHANGE IN GRID-RESISTOR VALUE

 $E_f = 5.0$ VOLTS ACCONDENSED-MERCURY TEMPERATURE = 40°C

CURVE	GRID RESISTOR MEGOHMS	CIRCUIT RETURN	PHASE ANGLE*
A	0.01	PIN 2	180°
B	0.1	PIN 2	180°
C	1	PIN 2	180°

*BETWEEN FILAMENT VOLTAGE AT PIN 4 AND
ANODE VOLTAGE



APRIL 12, 1954

TUBE DIVISION

92CM-8307

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



5696

THYRATRON

GAS-TETRODE, MINIATURE TYPE

5696

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathode:

Voltage. 6.3 ac or dc volts

Current. 0.150 amp

Cathode:

Minimum Heating Time, prior

to tube conduction . . . 10 sec

Direct Interelectrode Capacitances (Approx.):^oGrid No.1 to Anode . . . 0.03 μmf Input. 1.8 μmf Output 0.54 μmf

Ionization Time (Approx.):

For conditions: dc anode volts = 100; grid-No.1

square-pulse volts = +50; peak cathode

amperes during conduction = 0.150. 0.5 μsec

Deionization Time (Approx.):

For conditions: dc anode volts = 500; grid-No.1

volts = -100, grid-No.1 resistor (ohms) =

1000; dc cathode amperes = 0.025 25 μsec

For conditions: dc anode volts = 500; grid-No.1

volts = -13; grid-No.1 resistor (ohms) =

1000; dc cathode amperes = 0.025 40 μsec

Maximum Critical Grid-No.1 Current, with ac

anode-supply volts (rms) = 350, and

average cathode amperes = 0.025 0.5 μamp

Anode Voltage Drop (Approx.) 10 volts

Grid-No.1 Control Ratio (Approx.) with grid-No.1

resistor (megohms) = 0; grid-No.2 volts = 0 250

Grid-No.2 Control Ratio (Approx.) with grid-No.1

volts = 0, grid-No.2 resistor (ohms) = 0 15

^o Without external shield.**Mechanical:**

Mounting Position. Any

Maximum Overall Length 1-3/4"

Maximum Seated Length. 1-1/2"

Length, Base Seat to Bulb Top (excluding tip). 1-1/8" $\pm$ 3/32"

Maximum Diameter 3/4"

Bulb T-5-1/2

Base Small-Button Miniature 7-Pin

Basing Designation for BOTTOM VIEW 7BN

Pin 1-Grid No.1

Pin 2-Cathode

Pin 3-Heater

Pin 4-Heater

Pin 5-Grid No.2

Pin 6-Anode

Pin 7-Grid No.2



FEB. 1, 1949

TUBE DEPARTMENT

TENTATIVE DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



THYRATRON

RELAY and GRID-CONTROLLED RECTIFIER SERVICE

Maximum Ratings, Absolute Values:

PEAK ANODE VOLTAGE:

Forward.	500 max.	volts
Inverse.	500 max.	volts

GRID-No.2 (SHIELD-GRID) VOLTAGE:

Peak, before anode conduction.	-50 max.	volts
Average, during anode conduction [■]	-10 max.	volts

GRID-No.1 (CONTROL-GRID) VOLTAGE:

Peak, before anode conduction.	-100 max.	volts
Average, during anode conduction [■]	-10 max.	volts

CATHODE CURRENT:

Peak	0.1 max.	amp
Average [■]	0.025 max.	amp
Surge, for duration of 0.1 sec. max. . . .	2 max.	amp

GRID-No.2 CURRENT:

Average [■]	+0.005 max.	amp
--------------------------------	-------------	-----

GRID-No.1 CURRENT:

Average [■]	+0.005 max.	amp
--------------------------------	-------------	-----

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode .	100 max.	volts
Heater positive with respect to cathode .	25 max.	volts

AMBIENT TEMPERATURE RANGE. -55 to +90 °C

Typical Operating Conditions for Relay Service:

RMS Anode Voltage.	117	volts
Grid No.2.	Connected to cathode at	socket
RMS Grid-No.1 Bias Voltage [□]	5	volts
Peak Grid-No.1 Signal Voltage.	5	volts
Grid-No.1-Circuit Resistance	0.1	megohm
Anode-Circuit Resistance [#]	5000	ohms

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	10 max.	megohms
--	---------	---------

■ Averaged over any interval of 30 sec. max.

□ Approximately 180° out of phase with the anode voltage.

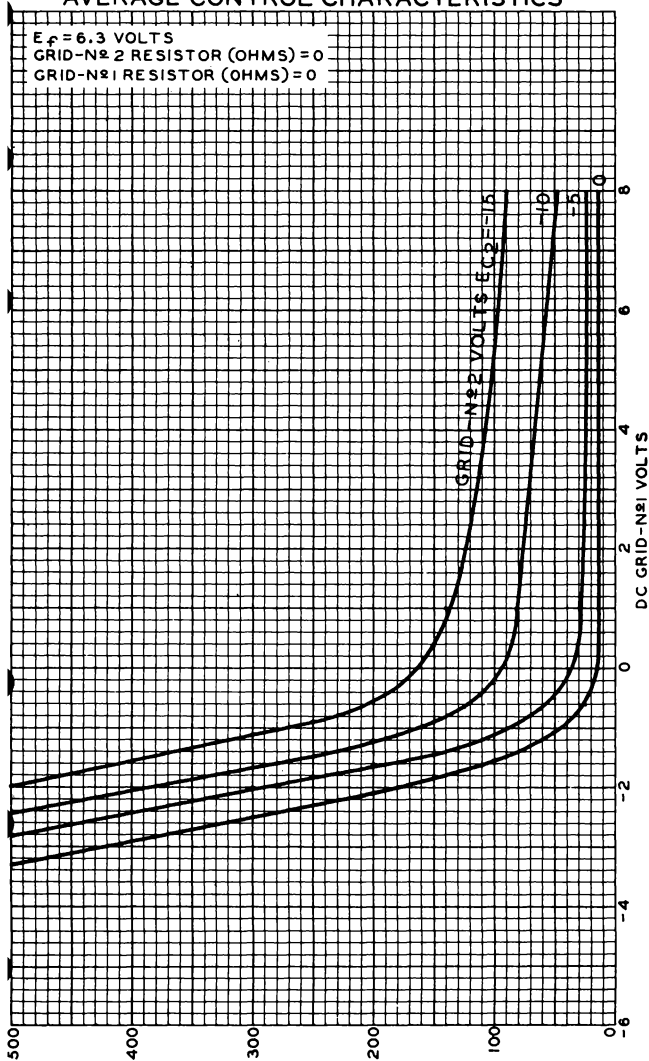
Sufficient resistance, including the tube load, must be used under any conditions of operation to prevent exceeding the current ratings.



5696

5696

AVERAGE CONTROL CHARACTERISTICS



AUG. 6, 1948

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7044

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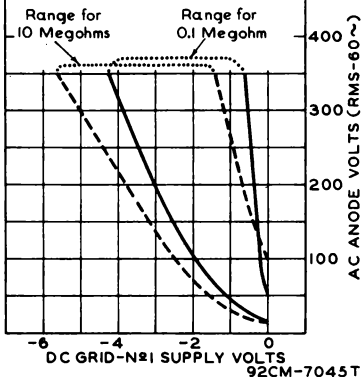
THYRATRON

OPERATIONAL RANGE OF CRITICAL GRID VOLTAGE

TYPE 5696

GRID-N₂ (SHIELD) VOLTS=0

RANGES SHOWN ARE FOR TWO VALUES OF GRID RESISTOR—0.1 MEG. AND 10 MEG.—AND TAKE INTO ACCOUNT INITIAL DIFFERENCES BETWEEN INDIVIDUAL TUBES & SUBSEQUENT DIFFERENCES DURING TUBE LIFE, FOR A HEATER-VOLTAGE RANGE OF 5.7 TO 6.9 VOLTS AND FOR AN AMBIENT TEMPERATURE RANGE OF -55 TO +90 °C

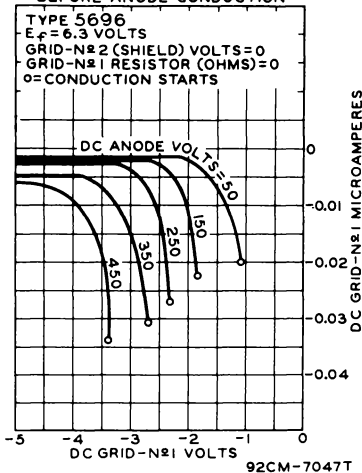
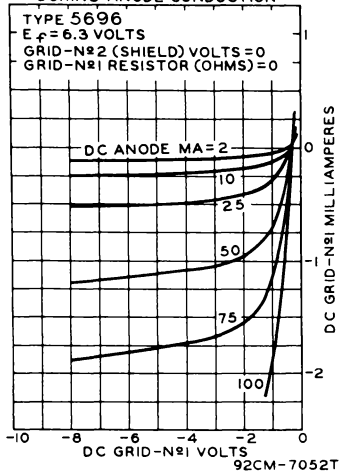




5696

5696

THYRATRON

AVERAGE CHARACTERISTICS
BEFORE ANODE CONDUCTIONAVERAGE CHARACTERISTICS
DURING ANODE CONDUCTION



5728

5728/FG-67

MERCURY-VAPOR THYRATRON

NEGATIVE/POSITIVE-CONTROL TRIODE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

	<i>Min.</i>	<i>Av.</i>	<i>Max.</i>	
Voltage (AC or DC) . . .	4.75	5.0	5.25	volts
Current at 5.0 volts . .	-	4.5	4.9	amp

Cathode:

Minimum Heating Time, prior to tube conduction	5	minutes
Maximum Outage Time, without reheating		See Curves

Direct Interelectrode Capacitances

(Approx., without external shield):

Grid to Anode	3.25	μ f
Grid to Cathode	8.9	μ f

Maximum Critical Grid Current

with ac anode volts (rms) = 220	10	μ amp
---	----	-----------

Anode Voltage Drop (Approx.) 16 volts

Ionization Time (Approx.):

For conditions: dc anode-supply volts = 100, peak grid volts = +35, and peak anode amperes = 15	15	μ sec
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Deionization Time (Approx.):

For conditions: dc anode volts = 120, dc grid-supply volts = -500, grid resistor (ohms) = 1000, and dc anode amperes = 2.5	5	μ sec
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For conditions: dc anode volts = 120, dc grid-supply volts = 0, grid resistor (ohms) = 1000, and dc anode amperes = 2.5	850	μ sec
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Mechanical:

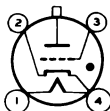
Mounting Position	Vertical, base down
Maximum Overall Length	7"
Seated Length	6-1/8" $\pm$ 1/4"
Maximum Diameter	3"
Bulb	ST-23
Cap	Medium (JETEC No. C1-5)
Base	Medium-Shell Small 4-Pin, Bayonet (JETEC No. A4-10)

BOTTOM VIEW

Pin 1: Heater

Pin 2: Cathode

(Grid & Anode
Return)



Pin 3: Grid

Pin 4: Heater,
Cathode



MERCURY-VAPOR THYRATRON

Temperature Control:

Heating—When the ambient temperature is so low that the normal rise of condensed-mercury temperature above the ambient temperature will not bring the condensed-mercury temperature up to the minimum value of the operating range specified under *Maximum Ratings*, some form of heat-conserving enclosure or auxiliary heater will be required.

Cooling—When the operating conditions are such that the maximum value of the operating condensed-mercury temperature is exceeded, provision should be made for forced-air cooling sufficient to prevent exceeding the maximum value.

Temperature Rise of Condensed Mercury to Equilibrium Above Ambient Temperature (Approx.):*

No Load	25	°C
Full Load	31	°C

INVERTER SERVICE

Maximum Ratings, Absolute Values:

PEAK ANODE VOLTAGE:

Forward	1000 max.	volts
Inverse	1000 max.	volts

GRID VOLTAGE:

Peak, before anode conduction	-500 max.	volts
Average●, during anode conduction	-5 max.	volts

CATHODE CURRENT:

Peak	15 max.	amp
Average●●	2.5 max.	amp
Fault, for duration of 0.1 sec. max.	200 max.	amp

GRID CURRENT:

Average●	+0.3 max.	amp
--------------------	-----------	-----

CONDENSED-MERCURY TEMPERATURE RANGE . . . +40 to +80 °C

* With heater voltage = 4.75 volts and no heat-conserving enclosure.

● Averaged over one conducting cycle.

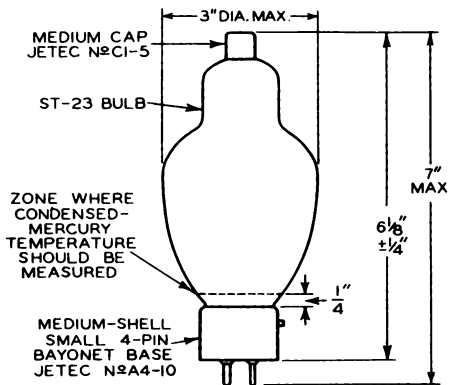
●● Averaged over any interval of 15 seconds maximum.



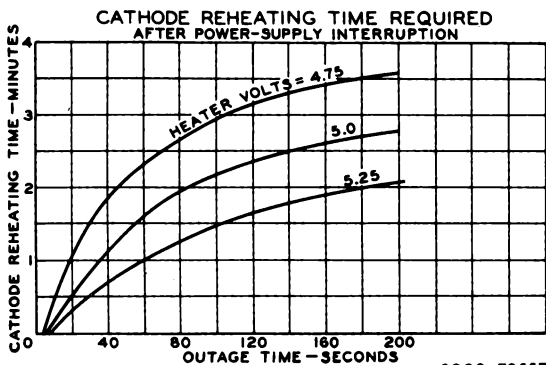
5728

5728/FG-67

MERCURY-VAPOR THYRATRON



92CS-6701R3



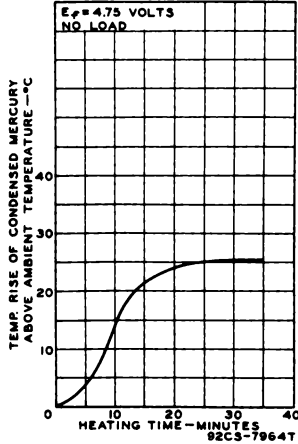
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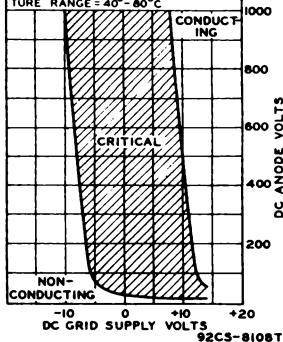


5728/FG-67

CHARACTERISTIC CURVES

RATE OF RISE OF COND.-
MERCURY TEMPERATUREOPERATIONAL RANGE
OF CRITICAL GRID VOLTAGE

RANGE IS FOR CONDITIONS WHERE:
 $E_f = 5.0$ VOLTS AC $\pm 5\%$; CIRCUIT
 RETURNS TO PIN #2. THE RANGE
 INCLUDES INITIAL AND LIFE VARI-
 ATIONS OF INDIVIDUAL TUBES, AS
 WELL AS CHANGE IN CHARACTER-
 ISTICS DUE TO HEATER PHASING.
 GRID RESISTOR (OHMS) = 0.
 CONDENSED-MERCURY TEMPERA-
 TURE RANGE = 40°-80°C



MARCH 1, 1954

TUBE DEPARTMENT
 RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

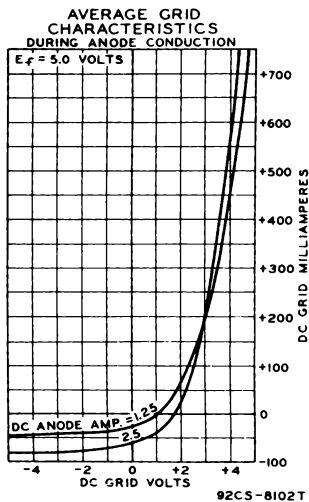
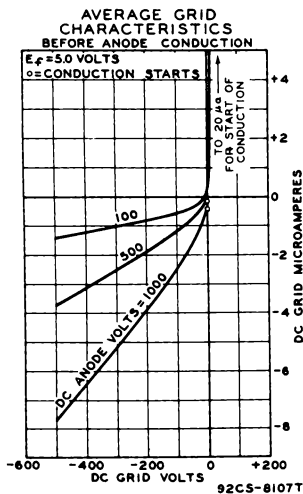
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 -8108T



5728

5728/FG-67

CHARACTERISTIC CURVES





5822-A IGNITRON

5822-A

WATER-COOLED, STEEL-JACKETED, MERCURY-POOL-CATHODE
TYPE HAVING MOUNTING PLATE FOR THERMOSTATIC CONTROL

For intermittent rectifier and frequency-changer welder service

GENERAL DATA

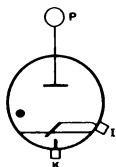
Electrical:

Cathode Excitation.	Cyclic
Cathode-Spot Starting.	By Ignitor
Minimum Requirements for Cathode Excitation:	
Peak ignitor voltage required to fire	200 volts
Peak ignitor current required to fire	30 amp
Starting time at required voltage or current.	100 μ sec
Tube Voltage Drop:	
At peak anode current of 1500 amperes	25 volts

Mechanical:

Operating Position.	Vertical, flexible lead up
Maximum Overall Length (Including flexible lead).	27-1/4"
Maximum Radius (Including water connections).	3-5/8"
Weight.	8.25 lbs
Terminal Connections (See Dimensional Outline):	

P - Anode
Terminal
(Flexible
lead)
K - Cathode
Terminal
(Bar oppo-
site anode
terminal)



I - Ignitor
Terminal
(Within
jacket
skirt at
cathode
end)

Cooling:

Type.	Water
Minimum inlet water temperature	10 $^{\circ}$ C
Maximum outlet water temperature.	35 $^{\circ}$ C
Minimum water flow.	1.5 gpm
Maximum water-temperature rise.	6 $^{\circ}$ C
Maximum pressure drop	5 psi

INTERMITTENT RECTIFIER SERVICE and FREQUENCY-CHANGER WELDER SERVICE

Maximum Ratings, Absolute-Maximum Values:

*For zero phase-control angle and
frequencies from 50 to 60 cps*

RATING I

PEAK ANODE VOLTAGE:

Forward	1200 max.	1200 max.	volts
Inverse	1200 max.	1200 max.	volts

5822-A



5822-A IGNITRON

ANODE CURRENT:

Peak.	420 max.	1500 max.	amp
Average (Averaged over any interval of 6.25 seconds maximum)	70 max.	20 max.	amp
Average (Averaged over any interval of 0.2 seconds maximum)	70 max.	250 max.	amp
Fault, for duration of 0.15 second maximum.	18750 max.	18750 max.	amp

RATING II

PEAK ANODE VOLTAGE:

Forward	1500 max.	1500 max.	volts
Inverse	1500 max.	1500 max.	volts

ANODE CURRENT:

Peak.	336 max.	1200 max.	amp
Average (Averaged over any interval of 6.25 seconds maximum)	56 max.	16 max.	amp
Average (Averaged over any interval of 0.2 seconds maximum)	56 max.	200 max.	amp
Fault, for duration of 0.15 second maximum.	15000 max.	15000 max.	amp

IGNITOR

Maximum Ratings, Absolute-Maximum Values:

PEAK IGNITOR VOLTAGE:

Positive.	Equal to anode volts
Negative.	5 max. volts

IGNITOR CURRENT:

Peak.	100 max.	amp
Average (Averaged over any interval of 5 seconds maximum)	1 max.	amp
RMS	10 max.	amp

OPERATING CONSIDERATIONS

The 5822-A is equipped with a mounting plate for mounting a thermostatic control calibrated either for controlling the flow of cooling water through the water jacket, or for protection of the ignitron against overheating.

When the cooling water is circulated successively through the water jackets of two or more ignitrons, the water-saving thermostat, if used, should be mounted on the ignitron connected directly to the water supply.

The water-saving thermostat, which has normally open contacts, is calibrated to close a circuit energizing a solenoid valve in the water-supply line and thus permit water



5822-A IGNITRON

5822-A

flow to start when the temperature of the thermostat mounting plate exceeds approximately 35° C. Because of the lag between the heating of the ignitron envelope and the functioning of the water-saving thermostat to start water flow through the water jackets, the ignitron may overheat before the flow of cooling water starts.

Such overheating can be prevented by the use of an auxiliary contactor shunted across the contacts of the water-saving thermostat and actuated by the welding-control switch. The contactor causes the solenoid valve in the water-supply line to open as soon as welding current flows.

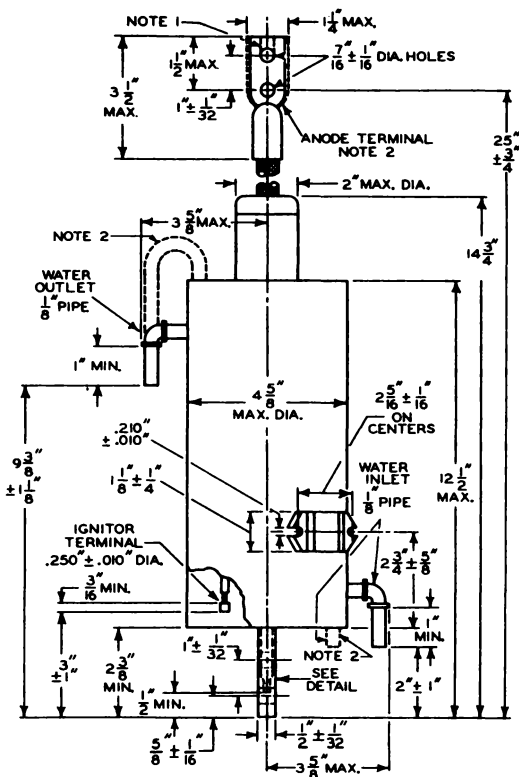
When a *protective thermostat* is used, it should be mounted on an ignitron from which the cooling water discharges into the drain. The protective thermostat is calibrated to open a set of normally closed contacts at a jacket temperature of approximately 52° C. The opening of these contacts causes a protective device to function. This device may be a relay opening the ignitor firing controls, or preferably, a circuit breaker which removes power from the ignitrons.

Care must be taken to insure that the water jacket of each ignitron is completely filled before power is applied. Tube operation with a partially filled water jacket may cause abnormal heating of the tube envelope with resultant arc-back which impairs tube life. It is also necessary to arrange the cooling system so as to prevent any draining of the water jackets when the flow of water ceases.

5822-A



5822-A IGNITRON



92CM-9772R1



6012

GAS THYRATRON

NEGATIVE-CONTROL TETRODE TYPE

6012

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

	Min.	Av.	Max.	
Voltage.	5.7	6.3	6.9	ac or dc volts
Current at 6.3 volts . . .	-	2.6	2.85	amp

Cathode:

Minimum heating time prior to tube conduction.	30	sec
Maximum outage time without reheating.	5	sec

Direct Interelectrode Capacitances

(Approx.):^o

Grid No.1 to anode	0.23	μf
Grid No.1 to cathode, grid No.2, and heater	5.8	μf
Anode to cathode, grid No.2, and heater	3.9	μf

Ionization Time (Approx.):

For conditions: dc anode volts = 100, grid-No.2 volts = 0, grid-No.1 square-pulse volts = +50, and peak anode amperes during conduction = 5.	0.5	μsec
--	-----	-----------------

Deionization Time (Approx.).

See Table I

Maximum Critical Grid-No.1 Current:

For conditions: ac anode-supply volts = 460 (rms), and average anode amperes = 0.5.	3	μamp
---	---	-----------------

Anode Voltage Drop (Approx.). 10 volts

Grid-No.1 Control Ratio (Approx.):

For conditions: grid-No.1 resistor (megohms) = 0, grid-No.2 resistor (megohms) = 0, and grid-No.2 volts = 0.	150	
--	-----	--

Grid-No.2 Control Ratio (Approx.):

For conditions: grid-No.1 resistor (megohms) = 0, grid-No.2 resistor (megohms) = 0, and grid-No.1 volts = 0.	650	
--	-----	--

Mechanical:

Mounting Position.	Any	
Maximum Overall Length.	3-7/8"	
Maximum Seated Length.	3-5/16"	
Maximum Diameter.	1-23/32"	
Bulb.	T-12	
Base.	Large-Wafer Octal 6-Pin	
with External Barriers and Sleeve (JETEC No.B6-100)		

^o Without external shield.

← Indicates a change.

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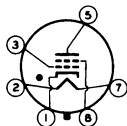


6012

GAS THYRATRON

Basing Designation for BOTTOM VIEW 6C0

Pin 1 - Cathode
Pin 2 - Heater
Pin 3 - Grid No.1



Pin 5 - Anode
Pin 7 - Heater
Pin 8 - Grid No.2

RELAY AND GRID-CONTROLLED RECTIFIER SERVICE

For anode-supply frequency of 60 cps

Maximum Ratings, Absolute Values:

PEAK ANODE VOLTAGE:

Forward.	650 max.	volts
Inverse.	1300 max.	volts

GRID-No.2 (SHIELD-GRID) VOLTAGE:

Peak, before tube conduction	-100 max.	volts
Average*, during tube conduction	-10 max.	volts

GRID-No.1 (CONTROL-GRID) VOLTAGE:

Peak, before tube conduction	-200 max.	volts
Average*, during tube conduction	-10 max.	volts

CATHODE CURRENT:

Peak	5 max.	amp
Average*	0.5 max.	amp
Fault, for duration of 0.1 second max.	20 max.	amp

AVERAGE GRID-No.2 CURRENT*	+0.05 max.	amp
--------------------------------------	------------	-----

AVERAGE GRID-No.1 CURRENT*	+0.05 max.	amp
--------------------------------------	------------	-----

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode.	100 max.	volts
Heater positive with respect to cathode.	25 max.	volts

AMBIENT-TEMPERATURE RANGE.	-75 to +90	°C
------------------------------------	------------	----

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	2 max.	megohms
--	--------	---------

* Averaged over any interval of 30 seconds maximum.

→ Indicates a change.



6012

6012

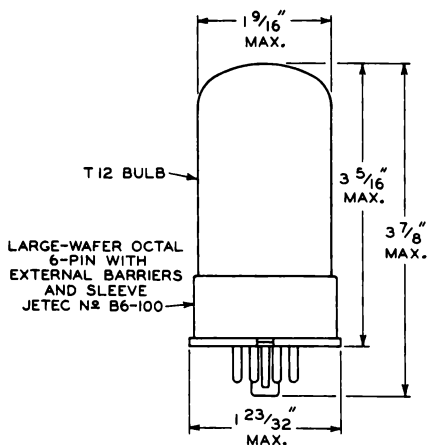
GAS THYRATRON

TABLE I

 E_{cc1} = DC Grid-No.1 Supply Voltage (Volts) E_{cc2} = DC Grid-No.2 Supply Voltage (Volts) R_{g1} = Grid-No.1 Resistor (Megohms) R_{g2} = Grid-No.2 Resistor (Ohms)

DC Anode Volts	125		250		R_{g1}	E_{cc1}	R_{g2}^*	E_{cc2}
DC Anode Amperes	0.5	1.0	0.5	1.0				
DEIONIZATION TIME μsec (Approx.)	175	225	250	275	0.001	-13	1000	0
	350	375	450	475	0.1			
	650	700	1100	1200	2			
	100	125	100	125	0.001	-100	1000	0
	125	150	150	175	0.1			
	250	275	275	300	2			

* Series resistor between grid No.2 and cathode.



92CS-7635RI

6012



6012

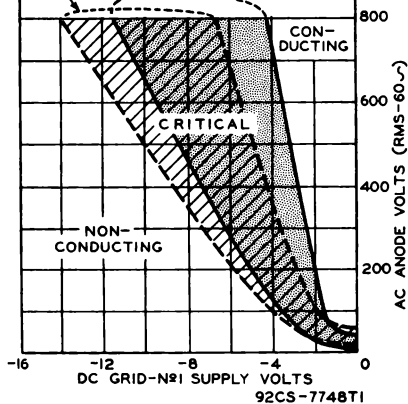
GAS THYRATRON

OPERATIONAL RANGE
OF CRITICAL GRID-N₂1 VOLTAGE

GRID-N₂2 (SHIELD) VOLTS=0
 RANGES SHOWN ARE FOR TWO VALUES
 OF GRID-N₂1 RESISTOR, 0.1 MEG. AND
 2 MEG., AND TAKE INTO ACCOUNT INITIAL
 DIFFERENCES BETWEEN INDIVIDUAL
 TUBES AND SUBSEQUENT DIFFERENCES
 DURING TUBE LIFE. FOR HEATER-
 VOLTAGE RANGE OF 5.7 TO 6.9 VOLTS
 AND FOR AN AMBIENT TEMPERATURE
 RANGE OF FROM -75° TO +90°C.

RANGE FOR
2 MEGOHMS

RANGE FOR
0.1 MEGOHM

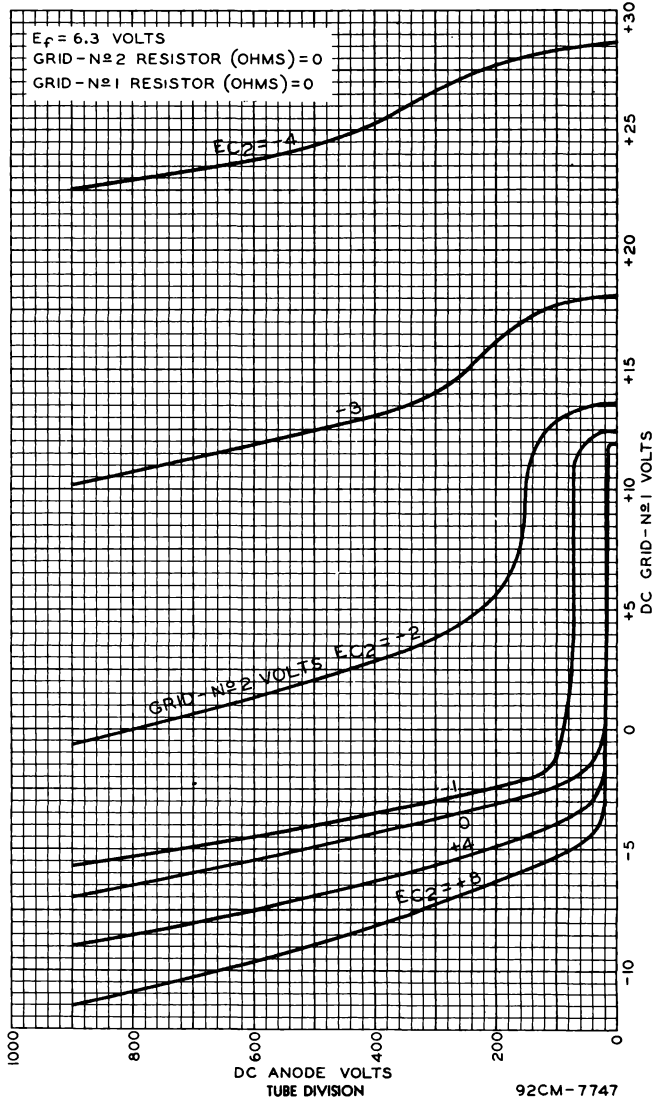




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AVERAGE CONTROL CHARACTERISTICS

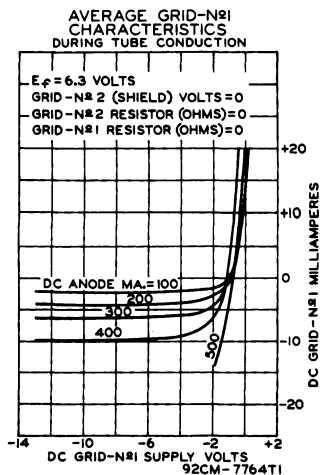
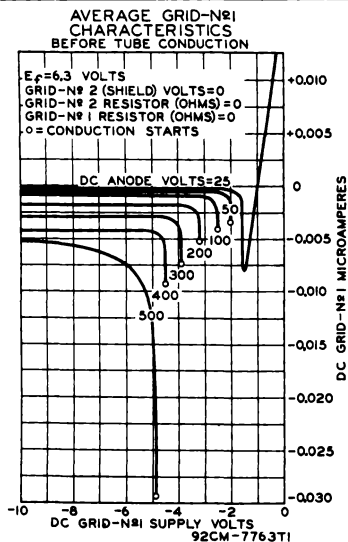


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6012

CHARACTERISTIC CURVES





6130

6130/3C45 HYDROGEN THYRATRON

POSITIVE-CONTROL TRIODE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage. 6.3 $\begin{cases} +5\% \\ -10\% \end{cases}$. . . ac or dc volts

Current at 6.3 volts:

Minimum. 2 amp

Average. 2.3 amp

Maximum. 2.5 amp

Minimum heating time. 2 minutes

Direct Interelectrode Capacitances

(Approx.):

Grid to anode. 3.9 μf

Grid to cathode. 8.6 μf

Ionization Time (Approx.) $\square$ 0.6 μsec

Deionization Time (Approx.). 25 μsec

Anode-Cathode Voltage Drop (Approx.)

at middle of pulse duration. 150 volts

Maximum Variation in Firing Time (Jitter). 0.06 μsec

Mechanical:

Operating Position. Any

Maximum Overall Length. 5-3/16"

Seated Length. 4-3/8" $\pm$ 3/16"

Maximum Diameter. 1-9/16"

Weight (Approx.). 3 oz

Cooling. Natural

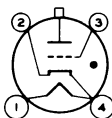
Bulb. T12

Cap. Small (JEDEC No. C1-1)

Base. Medium-Shell Small 4-Pin, Micanol (JEDEC No. A4-9)

Basing Designation for BOTTOM VIEW. 4BL

Pin 1-Heater
Pin 2-Cathode,
Circuit
Returns



Pin 3-Grid
Pin 4-Heater,
Cathode
Cap-Anode

PULSE-MODULATOR SERVICE

Maximum and Minimum CCS^o Ratings, Absolute Values:

For pressures down
to 70 mm of Hg^{*}

DC ANODE-SUPPLY VOLTAGE. 800 min. volts

PEAK ANODE VOLTAGE:

Forward ($E_{bm\text{f}}$)^{*}. 3000 max. volts

Inverse. 5% of $E_{bm\text{f}}$ min. volts

After anode-current pulse:[▲]

During first 25 μsec 1500 max. volts

After first 25 μsec 3000 max. volts

$\square$, $\bullet$, $\#$, $\ast$, $\blacktriangle$: See next page.



6130/3C45

HYDROGEN THYRATRON

For pressures down
to 70 mm of Hg*

GRID VOLTAGE:

Negative (DC or Peak), before conduction.	200 max.	volts
Peak positive-pulse.	175 min.	volts

ANODE CURRENT:

Peak	35 max.	amp
Average ^o	0.045 max.	amp
Rate of rise	750 max.	amp/μsec

OPERATION FACTOR†. 3×10^8 max.

PULSE DURATION*. 6 max. μsec

AMBIENT-TEMPERATURE RANGE. -50 to +90 °C

Typical Operation:‡

At 2000 pps in accompanying circuit
with pulse duration of 0.5 μsec

DC Anode-Supply Voltage. 1250 volts

Peak Anode Voltage:

Forward. 3000 volts

Inverse:

Immediately after anode-
current pulse. 530 volts

GRID VOLTAGE:

Negative, before conduction. 0 volts

Peak positive-pulse (Unloaded) 175 volts

Effective Grid-Circuit Resistance. 1000 ohms

ANODE CURRENT:

Peak 35 amp

Average^o 0.035 ampOperation Factor†. 2.1×10^8

Peak Power Output to Pulse

Transformer (T). 43000 watts

Maximum Circuit Values:

Effective Grid-Circuit Resistance. 1500 max. ohms

□ Defined as the time interval between the point on the rising portion of the grid pulse which is 26 per cent of the peak unloaded-pulse amplitude and the point on the anode-current pulse which is 26 per cent of its peak amplitude. The anode-current pulse has a maximum time rise of 0.05 μsec. The grid pulse has a minimum peak amplitude of 130 volts, a maximum rise time of 0.5 μsec, and is supplied by a driver having a maximum internal impedance of 1500 ohms.

● Continuous Commercial Service.

* Corresponds to altitude of about 50,000 feet.

* In applications where the anode voltage is applied instantaneously, the power-supply filter should be designed so that the peak forward anode voltage is applied at a rate not to exceed 75,000 volts per second.

▲ Exclusive of spike not having more than 0.05 μsec duration.

○ Averaged over any cycle.

† Defined as $\text{Peak Forward Anode Volts} \times \text{Pulse-Repetition Rate (pps)} \times \text{Peak Anode Amperes (excluding spike)}$.

* ‡: See next page.



6130/3C45

HYDROGEN THYRATRON

6130

- Pulse duration is defined as the time interval between points on the pulse envelope at which instantaneous amplitudes are equal to 70.7 per cent of the maximum amplitude excluding spike.
- Operation with a bulb temperature within the approximate range of 60° to 90° C measured on the bulb directly opposite the anode is recommended for longest life. To attain this temperature under operating conditions involving low ambient temperature, the use of a heat-conserving enclosure for the tube may be necessary.

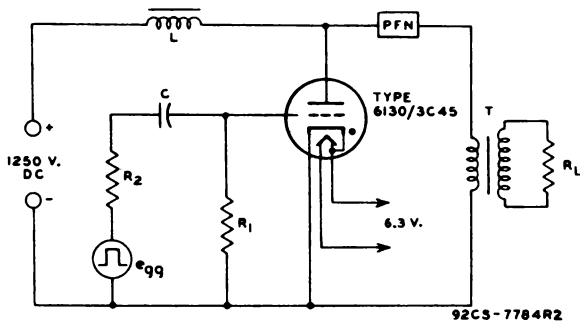
OPERATING CONSIDERATIONS

The *anode* is brought out of the tube to a Small cap. The connector for this cap should be of the heat-radiating type and the connector lead should have ample current-carrying capability for the operating requirements.

Shielding of the 6130/3C45 should be provided if it is operated in the presence of strong electric fields which will ionize the gas within the tube. Any such ionization will cause erratic performance.

Cooling of the 6130/3C45 is accomplished by natural circulation of air around it. Under no circumstances should a stream of cooling air be applied to the glass envelope.

TYPICAL PULSE-MODULATOR CIRCUIT



- C: Blocking Capacitor, 0.001 μ f
 egg: Pulse Generator supplying peak positive-pulse grid voltage of 175 volts (unloaded)
 L: Charging Choke, 5 henries
 PFN: Pulse-Forming Network with iterative impedance of 50 ohms, and a two-way transmission time of 0.5 μ sec
 R1: Grid Resistor, 30,000 ohms
 R2: Effective Resistance of grid circuit, 1000 ohms
 RL: Load Resistance. Value reflected into primary of transformer (T) is 35 ohms.
 T: Matching Pulse Transformer

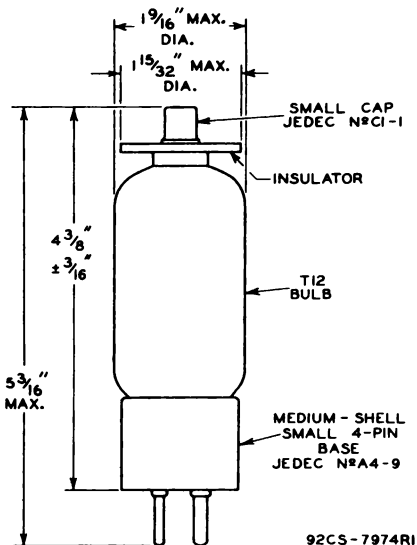
6130



6130/3C45

HYDROGEN THYRATRON

Devices and arrangements shown or described herein may use patents of RCA or others. Information contained herein is furnished without responsibility by RCA for its use and without prejudice to RCA's patent rights.



**RCA TUBE
HANDBOOK
HB-3**

**MISCELLANEOUS
TUBE
SECTION**



In this section, data are given for certain RCA tube types not falling within the scope of the other sections of this Handbook.

*For further Technical Information, write to
Commercial Engineering, Tube Department,
Radio Corporation of America, Harrison, N. J.*



PRICES[□] OF MISCELLANEOUS TUBE TYPES

Type	Schedule D [®]	Schedule U [▲]	Type	Schedule D [®]	Schedule U [▲]
0A2.....	\$ 2.90	-	1612.....	-	\$ 2.70
0A3*.....	2.65	-	1620.....	-	6.25
0A4-G.....	2.90	-	1621.....	-	1.95
0B2.....	3.20	-	1622.....	-	2.50
0C3*.....	2.65	-	1629.....	-	1.40
0D3*.....	2.65	-	1631.....	-	3.10
1C21.....	-	\$ 2.85	1632.....	-	3.25
2A4-G*.....	3.20	-	1633.....	-	1.95
2C21/1642*.....	-	1.90	1634*.....	-	1.40
2C22*.....	-	1.60	1635.....	-	2.00
2C40.....	-	24.00	1644.....	-	3.10
2C43.....	-	21.50	1654.....	-	4.55
2J50.....	-	192.00	1945.....	-	135.00
2K26.....	-	78.50	1946.....	-	10.90
2K56.....	-	•	1947.....	-	9.80
2Y3-G*.....	5.25	-	1949.....	-	11.30
2X2-A.....	4.35	-	1950.....	-	7.80
3A4.....	-	1.20	5651.....	-	2.30
3A5.....	-	1.95	5654.....	-	4.90
4J52.....	-	465.00	5675.....	-	15.20
5R4-GY.....	-	1.85	5690.....	-	11.25
6AS6.....	-	3.65	5691.....	-	9.50
6F4.....	-	6.40	5692.....	-	9.75
6J4.....	-	8.05	5693.....	-	7.75
6L4.....	-	6.60	5718.....	-	9.35
12A6.....	2.90	-	5719.....	-	9.35
12AY7.....	3.00	-	5726.....	-	2.00
12L8-GT.....	-	2.35	5734.....	-	18.00
12SW7.....	-	1.20	5751.....	-	3.80
12SX7-GT.....	-	1.55	5794.....	16.50	-
12SY7.....	-	1.45	5814.....	-	3.80
26A6.....	-	3.10	5823.....	-	1.32
26A7-GT.....	-	6.55	5825.....	-	13.00
26C6.....	-	2.10	5840.....	-	12.40
26D6.....	-	2.85	5876.....	-	15.20
559.....	-	5.35	5879.....	-	1.75
579-B.....	-	15.00	5890.....	-	26.00
864*.....	-	5.00	5893.....	-	19.40
874*.....	-	3.10	5915.....	-	1.20
878*.....	-	12.75	5963.....	-	1.40
954.....	-	5.65	5964.....	-	1.50
955.....	-	3.60	6026.....	-	2.95
956.....	-	7.00	6073.....	8.00	-
957.....	-	3.75	6074.....	8.90	-
958-A.....	-	6.50	6080.....	-	6.00
959.....	-	6.25	6082.....	-	5.30
991.....	-	0.75	6101.....	-	8.00
1609.....	-	10.25	6173.....	-	15.80

(notes on next page)

OCT. 1, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

MISC. TUBE
PRICES



PRICES OF MISCELLANEOUS TUBE TYPES

Type	Schedule D [□]	Schedule U [▲]	Type	Schedule D [□]	Schedule U [▲]
6211.....	-	\$ 2.95	9002.....	-	\$ 2.50
8013-A.....	-	10.30	9003.....	-	3.40
8020.....	-	24.00	9004.....	-	2.30
9001.....	-	3.40	9005.....	-	3.45
			9006.....	-	1.60

- This price list applies only in the United States of America and is subject to change without notice. The price includes Federal Excise Tax, where applicable. All prices are exclusive of any State and local excise, sales and similar taxes.
- Schedule D shows list prices for tube types priced for distribution through dealer and service channels.
- ▲ Schedule U shows user prices for tube types priced for distribution through other than dealer and service channels.
- * For data see 0A3/VR75, 0C3/VR105, and 0D3/VR150, respectively.
- ◆ Not recommended for new equipment design.
- Discontinued type. Data sheets have been retained in book for reference purposes only.

INFORMATION ON PURCHASING ABOVE TYPES

Information as to where *Miscellaneous Types* of RCA Tubes can be purchased may be obtained from our regional office nearest you or from Tube Department, Radio Corporation of America, Harrison, N.J.



MAX. D-C HEATER-CATHODE POTENTIALS OF MISCELLANEOUS TYPES

Based on JAN Specifications as of January 3, 1944

The following Miscellaneous Tubes appear in the JAN Specifications as having an absolute maximum heater-cathode potential rating as shown below. The corresponding design-center maximum ratings may be taken as 90 volts and 80 volts, respectively, for the 100- and 90-volt absolute maximum values. Types for which heater-cathode potential ratings are given on their data pages are not included in this list.

<i>Type</i>	<i>Absolute Max. Volts</i>
2C21/1642	100
2C22	100
6C4	100
12A6	100
954	90
955	90
956	90
1629	100
1635	100
9001	90
9002	90
9003	90

(Tentative)

JAN. 15, 1944

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

MISC. TUBE H-K
POTENTIALS



OA2

OA2

VOLTAGE REGULATOR

MINIATURE GLOW-DISCHARGE TYPE

GENERAL DATA**Electrical:**

Cathode. Cold

Mechanical:

Mounting Position. Any

Maximum Overall Length. 2-5/8"

Maximum Seated Length. 2-3/8"

Length, Base Seat to Bulb Top (Excluding tip) 2" $\pm 3/32$ "

Maximum Diameter 3/4"

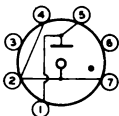
Weight (Approx.) 0.3 oz

Bulb T-5-1/2

Base Small-Button Miniature 7-Pin (JETEC No.E7-1)

Basing Designation for BOTTOM VIEW 5B0

Pin 1 - Anode
 Pin 2 - Cathode
 Pin 3 - Internal
 Connection-
 Do Not Use
 Pin 4 - Cathode



Pin 5 - Anode
 Pin 6 - Internal
 Connection-
 Do Not Use
 Pin 7 - Cathode

Maximum and Minimum Ratings, Absolute Values:

AVERAGE STARTING CURRENT. 75 max. ma

DC CATHODE CURRENT { 30 max. ma
 5 min. ma

FREQUENCY. 0 max. cps

AMBIENT-TEMPERATURE RANGE. -55 to +90 °C

Circuit Values:Shunt Capacitor. 0.1 max. μ f

Series Resistor. See Operating Considerations

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Min.	Av.	Max.	
DC Anode-Supply Voltage.	185 [■]	-	-	volts
Anode Breakdown Voltage.	-	156	185*	volts
Anode Voltage Drop	140 [●]	151	168*	volts
Regulation (5 to 30 ma).	-	2	6*	volts

◆ Averaged over starting period not exceeding 10 seconds. This starting period must be followed by a steady-state operating condition of at least 20 minutes, or tube performance will be impaired.

■ Not less than indicated supply voltage should be provided to insure "starting" throughout tube life.

* Maximum individual tube value during useful life.

● Minimum individual tube value during useful life.

←Indicates a change.

OA2



OA2

VOLTAGE REGULATOR

OPERATING CONSIDERATIONS

Sufficient resistance must always be used in series with the OA2 to limit the current through the tube. The value for the series resistor is dependent on the maximum anode-supply voltage and the ratio of the current through the load to the operating current of the OA2, and should be chosen to limit the operating current through the tube to 30 milliamperes at all times after the starting period.

The maximum load current that can be regulated by the OA2 is determined by the minimum and maximum values of the supply voltage. After the value of series resistor for the maximum supply voltage has been calculated as indicated above, it is then in order to determine if this value will permit adequate starting voltage when the supply voltage falls to its minimum value. If adequate starting voltage is not obtained, a new load current of lower value must be used and the calculations repeated. It will be apparent from such calculations that the higher the minimum supply voltage and the smaller the difference between its minimum and maximum values, the higher will be the load current that can be regulated.

When equipment utilizing the OA2 is "turned on", a starting current in excess of the average operating current is permissible as indicated under Maximum Ratings. When the tube is subjected to such high starting currents, the regulated voltage may require up to 20 minutes to drop to its normal operating value. This performance is characteristic of voltage-regulator tubes of the glow-discharge type. Similarly, the regulation is affected by changes in current within the operating current range. For example, the regulation of a tube operated for a protracted period at 5 milliamperes and then changed to 25 milliamperes, may be somewhat different from the value that will be obtained after a long period of operation at 25 milliamperes. Likewise, the regulation may change somewhat after a long idle period.

In order to handle more load current, two or more OA2's may be operated in parallel, but such parallel operation requires that a resistance of approximately 100 ohms be used in series with each OA2 in order to equalize division of the current between the paralleled tubes. The disadvantage of this method, of course, is that the use of resistors impairs the regulation which can be obtained.

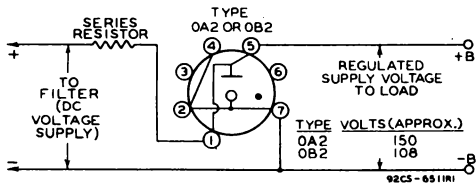
If the associated circuit has a capacitor in shunt with the OA2, the capacitor should be limited in value to 0.1 μf . A larger value may cause the OA2 to oscillate and thus give unstable regulation performance.



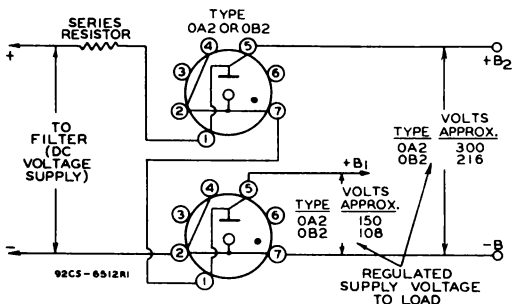
OA2

VOLTAGE REGULATOR

OA2



Typical circuit to provide regulated supply voltage of approximately 150 or 108 volts to load. Removal of tube from socket removes voltage from load.



Typical circuit using two OA2's or two OB2's to provide regulated supply voltages of approximately 300 or 216 volts and 150 or 108 volts to load. Socket connections are so made that voltage on load is removed when either tube is taken from its socket.

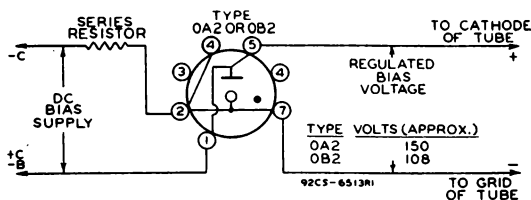
CIRCUIT FOR BIAS-SUPPLY REGULATION
IS SHOWN ON NEXT PAGE.

Many of the devices and arrangements shown or described herein use inventions of patents owned by RCA or others. Information contained herein is furnished without assuming any responsibility for its use.

OA2



OA2 VOLTAGE REGULATOR



Typical circuit for bias-supply regulation. Removal of tube from socket opens B-supply circuit of regulated tubes.



OA3

VOLTAGE REGULATOR

GLOW-DISCHARGE TYPE

OA3

GENERAL DATA

Electrical:

Cathode Cold

Mechanical:

Mounting Position Any

Maximum Overall Length 4-1/8"

Seated Length 3-3/8" $\pm$ 3/16" ←

Maximum Diameter 1-9/16"

Dimensional Outline See General Section

Weight (Approx.) 1.3 oz ←

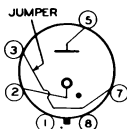
Bulb ST-12

Base Small-Shell Octal 6-Pin (JETEC No. B6-3) ←

Basing Designation for BOTTOM VIEW 4AJ

Pin 1—No Connection

Pin 2—Cathode

Pin 3—Jumper[▲]

Pin 5—Anode

Pin 7—Jumper[▲]

Pin 8—No Connection

Maximum and Minimum Ratings, Absolute Values:

AVERAGE STARTING CURRENT[◆] 100 max. ma

DC CATHODE CURRENT { 40 max. ma

5 min. ma

FREQUENCY 0 max. cps ←

AMBIENT-TEMPERATURE RANGE -55 to +90 °C

Circuit Values:

Shunt Capacitor 0.1 max. μ f ←

Series Resistor See Operating Considerations

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN ←

	Min.	Av.	Max.	
DC Anode-Supply Voltage	105 [■]	—	—	volts
Anode Breakdown Voltage	—	100	105*	volts
Anode Voltage Drop	68 [●]	75	85*	volts
Regulation(5 to 40 ma)	—	5	6.5*	volts

[▲] With suitable socket connections, jumper within base acts as a switch to open power-supply circuit when voltage regulator tube is removed from socket.

[◆] Averaged over starting period not exceeding 10 seconds. This starting period must be followed by a steady-state operating condition of at least 20 minutes, or tube performance will be impaired.

[■] Not less than indicated supply voltage should be provided to insure "starting" throughout tube life.

* Maximum individual tube value during useful life.

● Minimum individual tube value during useful life.

← Indicates a change.



VOLTAGE REGULATOR

OPERATING CONSIDERATIONS

Sufficient resistance must always be used in series with the OA3 to limit the current through the tube. The value for the series resistor is dependent on the maximum anode-supply voltage and the ratio of the current through the load to the operating current of the OA3, and should be chosen to limit the operating current through the tube to 40 milliamperes at all times after the starting period.

The maximum load current that can be regulated by the OA3 is determined by the minimum and maximum values of the supply voltage. After the value of series resistor for the maximum supply voltage has been calculated as indicated above, it is then in order to determine if this value will permit adequate starting voltage when the supply voltage falls to its minimum value. If adequate starting voltage is not obtained, a new load current of lower value must be used and the calculations repeated. It will be apparent from such calculations that the higher the minimum supply voltage and the smaller the difference between its minimum and maximum values, the higher will be the load current that can be regulated.

When equipment utilizing the OA3 is "turned on", a starting current in excess of the average operating current is permissible as indicated under Maximum Ratings. When the tube is subjected to such high starting currents, the regulated voltage may require up to 20 minutes to drop to its normal operating value. This performance is characteristic of voltage-regulator tubes of the glow-discharge type. Similarly, the regulation is affected by changes in current within the operating-current range. For example, the regulation of a tube operated for a protracted period at 5 milliamperes and then changed to 35 milliamperes, may be somewhat different from the value that will be obtained after a long period of operation at 35 milliamperes. Likewise, the regulation may change somewhat after a long idle period.

In order to handle more load current, two or more OA3's may be operated in parallel, but such parallel operation requires that a resistance of approximately 100 ohms be used in series with each OA3 in order to equalize division of the current between the paralleled tubes. The disadvantage of this method, of course, is that the use of resistors impairs the regulation which can be obtained.

If the associated circuit has a capacitor in shunt with the OA3, the capacitor should be limited in value to 0.1 μf . A larger value may cause the OA3 to oscillate and thus give unstable regulation performance.

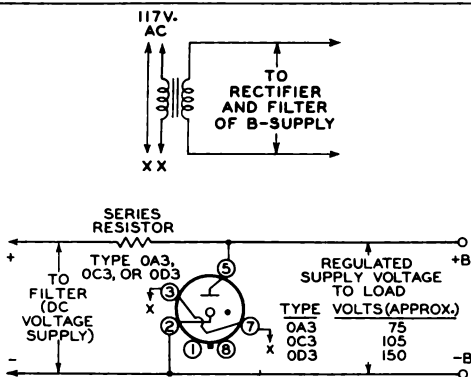
→ Indicates a change.



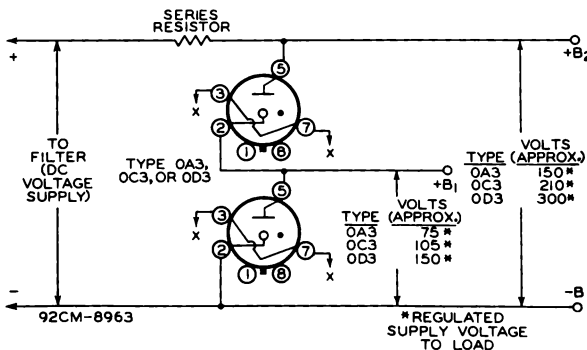
OA3

OA3

VOLTAGE REGULATOR



Typical circuit to provide regulated supply voltage of approximately 75, 105, or 150 volts to load. Removal of tube from socket removes voltage from load.



Typical circuit using two OA3's, two OC3's, or two OD3's to provide regulated supply voltages of approximately 150, 210, or 300 volts and 75, 105, or 150 volts to load. Socket connections are so made that voltage on load is removed when either tube is taken from its socket.

Devices and arrangements shown or described herein may use patents of RCA or others. Information contained herein is furnished without responsibility by RCA for its use and without prejudice to RCA's patent rights.



0A4-G

GAS-TRIODE

COLD-CATHODE STARTER-ANODE TYPE

Maximum Overall Length

4-1/8"

Maximum Diameter

1-9/16"

Bulb

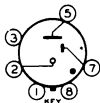
ST-12

Base

Pin 1—No Connection

Pin 2—Cathode

Pin 3—No Connection



Small Shell Octal 6-Pin

Pin 5—Anode

Pin 7—Starter-Anode

Pin 8—No Connection

BOTTOM VIEW

CHARACTERISTICS

Peak Anode Breakdown Voltage (Starter anode tied to cathode)

225 min. volts

Peak Positive Starter-Anode Breakdown Voltage

70 min. volts

90 max. volts

Starter-Anode Current (For transition of discharge to anode at 140 volts peak)

100 max. μ amp.

Starter-Anode Drop

60 approx. volts

Anode Drop

70 approx. volts

MAXIMUM RATINGS and TYPICAL OPERATING CONDITIONS

Relay Service

Peak Cathode Current

100 max. ma.

D-C Cathode Current

25 max. ma.

Typical Operation with A-C Supply:

Anode-Supply Voltage (RMS)

105—130 volts

A-C Starter-Anode Voltage (peak)

70 max. volts

R-F Starter-Anode Voltage (peak)

55 min. volts

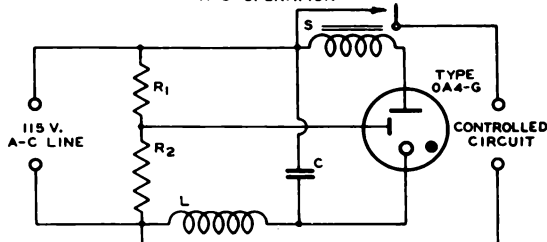
Sum of A-C and R-F Starter-

Anode Voltages (peak)

110 min. volts

SCHEMATIC RELAY CIRCUIT USING TYPE 0A4-G

A-C OPERATION



C } = HIGH-Q TUNED CIRCUIT FOR R-F SIGNAL
L }

R₁ = 15000 OHMS (1/2 WATT)

R₂ = 10000 OHMS (1/2 WATT)

S = RELAY—CHOSEN FOR DESIGN REQUIREMENTS

The license extended to the purchaser of tubes appears in the License Notice accompanying them. Information contained herein is furnished without assuming any obligations.

APRIL 20, 1938

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

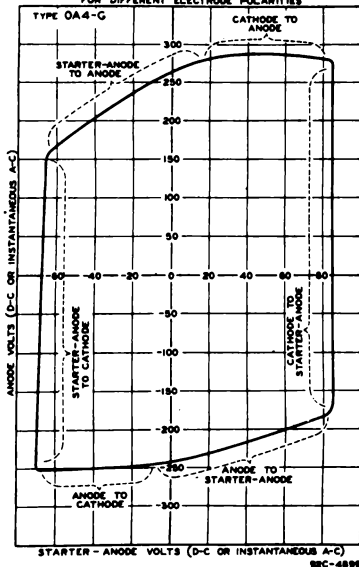
TENTATIVE DATA

0A4-G

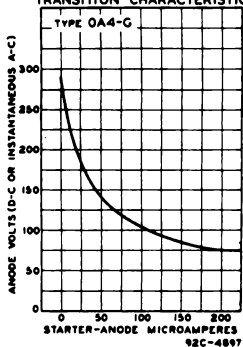


0A4-G GAS-TRIODE

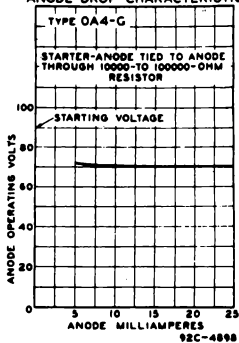
TYPICAL BREAKDOWN CHARACTERISTICS
FOR DIFFERENT ELECTRODE POLARITIES



AVERAGE
TRANSITION CHARACTERISTIC



AVERAGE
ANODE-DROP CHARACTERISTIC



APRIL 20, 1938

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-4897,
4898, 4899



OB2

OB2

VOLTAGE REGULATOR

MINIATURE GLOW-DISCHARGE TYPE

GENERAL DATA

Electrical:

Cathode. Cold

Mechanical:

Mounting Position. Any

Maximum Overall Length. 2-5/8"

Maximum Seated Length. 2-3/8"

Length, Base Seat to Bulb Top (Excluding tip). . . 2" $\pm$ 3/32"

Maximum Diameter. 3/4"

Weight (Approx.) 0.3 oz

Bulb T-5-1/2

Base Small-Button Miniature 7-Pin (JETEC No. E7-1)

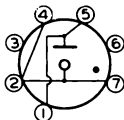
Basing Designation for BOTTOM VIEW 5B0

Pin 1 - Anode

Pin 2 - Cathode

Pin 3 - Internal
Connection-
Do Not Use

Pin 4 - Cathode



Pin 5 - Anode

Pin 6 - Internal
Connection-
Do Not Use

Pin 7 - Cathode

Maximum and Minimum Ratings, Absolute Values:

AVERAGE STARTING CURRENT $\blacklozenge$ 75 max. maDC CATHODE CURRENT { 30 max. ma
5 min. ma

FREQUENCY. 0 max. cps

AMBIENT-TEMPERATURE RANGE. -55 to +90 $^{\circ}$ C

Circuit Values:

Shunt Capacitor. 0.1 max. μ mf

Series Resistor. See note below

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Min.	Av.	Max.—	
DC Anode-Supply Voltage. . . .	133 $\blacklozenge$	—	—	volts
Anode Breakdown Voltage. . . .	—	115	133*	volts
Anode Voltage Drop	101 $\bullet$	108	114*	volts
Regulation (5 to 30 ma.)	—	1	4*	volts

$\blacklozenge$ Averaged over starting period not exceeding 10 seconds. This starting period must be followed by a steady-state operating condition of at least 20 minutes, or tube performance will be impaired.

* Not less than indicated supply voltage should be provided to insure "starting" throughout tube life.

$\bullet$ Maximum individual tube value during useful life.

$\bullet$ Minimum individual tube value during useful life.

The operating considerations and circuit information shown under Type OA2 also apply to Type OB2

←Indicates a change.



OC3

OC3

VOLTAGE REGULATOR

GLOW-DISCHARGE TYPE

GENERAL DATA

Electrical:

Cathode Cold

Mechanical:

Mounting Position Any

Maximum Overall Length 4-1/8"

Seated Length 3-3/8" $\pm$ 3/16" ←

Maximum Diameter 1-9/16"

Dimensional Outline See General Section

Weight (Approx.) 1.3 oz ←

Bulb ST-12 ←

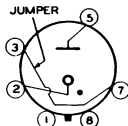
Base Small-Shell Octal 6-Pin (JETEC No. B6-3) ←

Basing Designation for BOTTOM VIEW 4AJ

Pin 1—No Connec-
tion

Pin 2—Cathode

Pin 3—Jumper▲



Pin 5—Anode

Pin 7—Jumper▲

Pin 8—No Connec-
tion

Maximum and Minimum Ratings, Absolute Values:

AVERAGE STARTING CURRENT♦ 100 max. ma

DC CATHODE CURRENT { 40 max. ma

FREQUENCY { 5 min. ma

AMBIENT-TEMPERATURE RANGE 0 max. cps ←

-55 to +90 °C ←

Circuit Values:

Shunt Capacitor 0.1 max. μ f ←

Series Resistor See note below ←

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN ←

	Min.	Av.	Max.	
DC Anode-Supply Voltage	133 [■]	—	—	volts
Anode Breakdown Voltage	—	115	133*	volts
Anode Voltage Drop	103 [●]	108	116*	volts
Regulation (5 to 40 ma)	—	2	4*	volts

▲ With suitable socket connections, jumper within base acts as a switch to open power-supply circuit when voltage regulator tube is removed from socket.

♦ Averaged over starting period not exceeding 10 seconds. This starting period must be followed by a steady-state operating condition of at least 20 minutes, or tube performance will be impaired.

■ Not less than indicated supply voltage should be provided to insure "starting" throughout tube life.

* Maximum individual tube value during useful life.

● Minimum individual tube value during useful life.

The operating considerations and circuit information shown under Type OA3 also apply to Type OC3

← Indicates a change.

OD3



OD3

VOLTAGE REGULATOR

GLOW-DISCHARGE TYPE

GENERAL DATA

Electrical:

Cathode Cold

Mechanical:

Mounting Position Any

Maximum Overall Length 4-1/8"

→ Seated Length 3-3/8" ± 3/16"

Maximum Diameter 1-9/16"

Dimensional Outline See General Section

→ Weight (Approx.) 1.3 oz

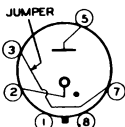
Bulb ST-12

→ Base Small-Shell Octal 6-Pin (JETEC No. B6-3)

Basing Designation for BOTTOM VIEW 4AJ

Pin 1 - No Connection

Pin 2 - Cathode

Pin 3 - Jumper[▲]

Pin 5 - Anode

Pin 7 - Jumper[▲]

Pin 8 - No Connection

Maximum and Minimum Ratings, Absolute Values:

AVERAGE STARTING CURRENT[◆] 100 max. ma

DC CATHODE CURRENT { 40 max. ma

→ FREQUENCY { 5 min. ma

→ AMBIENT-TEMPERATURE RANGE 0 max. cps

-55 to +90 °C

→ Circuit Values:

Shunt Capacitor 0.1 max. μf

Series Resistor See note below

→ CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Min.	Average	Max.	
DC Anode-Supply Voltage	185 [■]	-	-	volts
Anode Breakdown Voltage	-	160	185*	volts
Anode Voltage Drop	142 [●]	153	165*	volts
Regulation (5 to 40 ma)	-	4	5.5*	volts

[▲] With suitable socket connections, jumper within base acts as a switch to open power-supply circuit when voltage regulator tube is removed from socket.

[◆] Averaged over starting period not exceeding 10 seconds. This starting period must be followed by a steady state operating condition of at least 20 minutes, or tube performance will be impaired.

[■] Not less than indicated supply voltage should be provided to insure "starting" throughout tube life.

* Maximum individual tube value during useful life.

● Minimum individual tube value during useful life.

The operating considerations and circuit information shown under Type OA3 also apply to Type OD3

→ Indicates a change.



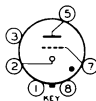
IC21

IC21

GAS-TRIODE

COLD-CATHODE GLOW-DISCHARGE TYPE

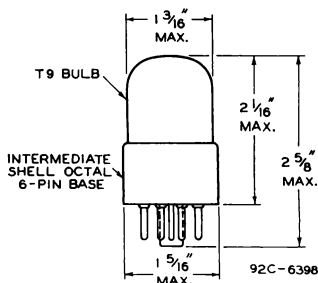
Maximum Overall Length	2-5/8"
Maximum Seated Height	2-1/16"
Maximum Diameter	1-5/16"
Bulb	T-9
Base	Intermed.Sh.Octal 6-Pin
Pin 1—No Connection	Pin 7—Grid
Pin 2—Cathode	Pin 8—No Connection
Pin 3—No Connection	• —Gas Tube Type
Pin 5—Anode	
Mounting Position	BOTTOM VIEW (G-4V)
	Any

**CHARACTERISTICS**

Peak Anode Breakdown Voltage (Grid tied to cathode)	180 min. volts
Peak Positive Grid Breakdown Voltage	{ 66 min. volts
	{ 80 max. volts
D-C Anode Extinction Voltage	73 approx. volts
Grid Current (For transition of discharge to anode at 100 volts peak)	{ 25 av. μ amp.
	{ 50 max. μ amp.
Anode Voltage-Drop	73 approx. volts
Grid Voltage-Drop	55 approx. volts

*Maximum Ratings Are Design-Center Values***MAXIMUM RATINGS**

Peak Cathode Current	100 max. ma.
D-C Cathode Current	25 max. ma.
Typical Operation as Relay Tube:	
D-C Anode-Supply Voltage	125 - 145 volts
Peak Positive Grid-Bias Voltage	66 max. volts
Peak Grid-Signal Voltage	40 min. volts
Sum of Grid-Bias and Grid-Signal Voltages (Peak)	100 min. volts
D-C Grid Current	100 μ amp.



92C-6398

Dec. 1, 1942

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

TENTATIVE DATA

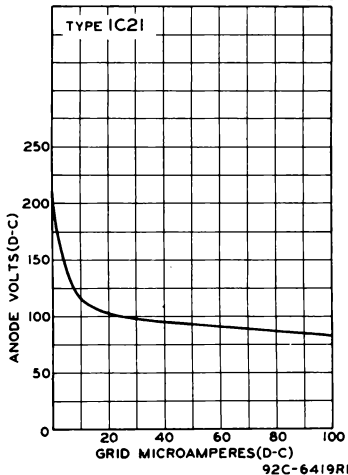
IC21



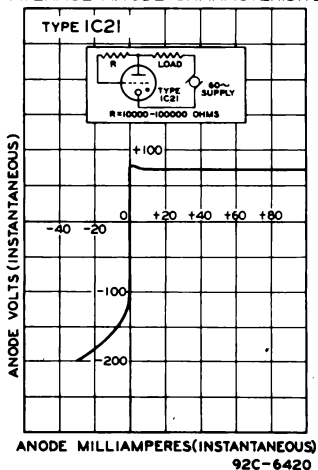
IC21

GAS-TRIODE

AVERAGE TRANSITION CHARACTERISTIC



AVERAGE ANODE CHARACTERISTIC



Dec. 1, 1942

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.92C-6419R1
92C-6420



2A4-G

2A4-G

GAS-TRIODE

HOT-CATHODE CONTROL-GRID TYPE

Filament	Coated	
Voltage*	2.5	a-c or d-c volts
Current	2.5	amp.
Maximum Overall Length		4-1/8"
Maximum Seated Height		3-9/16"
Maximum Diameter		1-9/16"
Bulb		ST-12
Base		Small Shell Octal 7-Pin
Pin 1-No Connection		Pin 5-Grid
Pin 2-Filament +		Pin 7-Filament -
Pin 3-Plate		Pin 8-No Connection
Pin 4-No Connection		
Mounting Position	BOTTOM VIEW (G-5S ₇)	Any

RELAY SERVICE

Peak Inverse Anode Voltage	200 max. volts
Peak Forward Anode Voltage	200 max. volts
Peak Voltage Between Any Two Electrodes	250 max. volts
Peak Anode Current	1.25 max. amp.
Average Anode Current (Averaged over Any Period of 45 Seconds)	0.10 max. amp.
Anode Drop	15 volts

* Filament voltage should be applied for 2 seconds before current is drawn from the anode.

July 1, 1941

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

TENTATIVE DATA



2C21/1642

TWIN-TRIODE AMPLIFIER

Heater ■	Coated Unipotential Cathodes		
Voltage	6.3	a-c or d-c volts	
Current	0.6	amp.	
Direct Interelectrode Capacitances:°			
	<u>Triode Unit T₁</u>	<u>Triode Unit T₂</u>	
Grid to Plate	2.4	1.8	μf
Grid to Cathode	2.6	1.6	μf
Plate to Cathode	1.4	2.0	μf
Overall Length	4-9/32" to 4-17/32"		
Seated Height	3-21/32" to 3-29/32"		
Maximum Diameter	1-9/16"		
Bulb	ST-12		
Cap	Small Metal		
Base	Small 7-Pin, Micanol		
Pin 1-Heater	Pin 5-Plate T ₁		
Pin 2-Cathode T ₂	Pin 6-Cathode T ₁		
Pin 3-Plate T ₂	Pin 7-Heater		
Pin 4-Grid T ₁	Cap -Grid T ₂		
RCA Socket	Stock No.9922		
Mounting Position	Any		



BOTTOM VIEW (7BH)

Maximum Ratings Are Design-Center Values

AMPLIFIER - Each Unit

Plate Voltage	250 max. volts
Plate Dissipation	2.1 max. watts
<i>Characteristics - Class A₁ Amplifier:</i>	
Plate Voltage	250 volts
Grid Voltage	-16.5 volts
Amplification Factor	10.4
Plate Resistance	7600 ohms
Transconductance	1375 μmhos
Plate Current	8.3 ma.

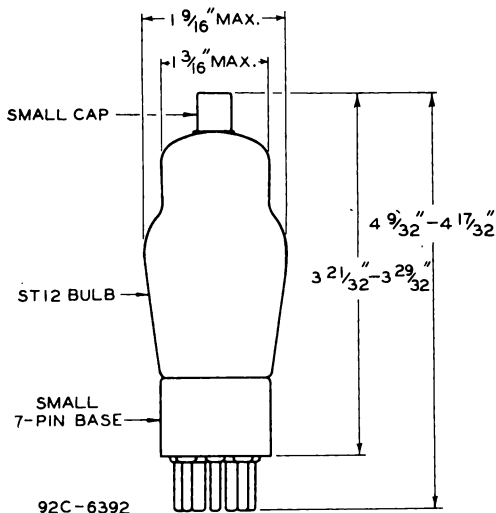
- In circuits where the cathode is not directly connected to the heater, the potential difference between heater and cathode should be kept as low as possible.
- ° with no external shield.

2C21



2C21

TWIN-TRIODE AMPLIFIER



Mar. 20, 1943

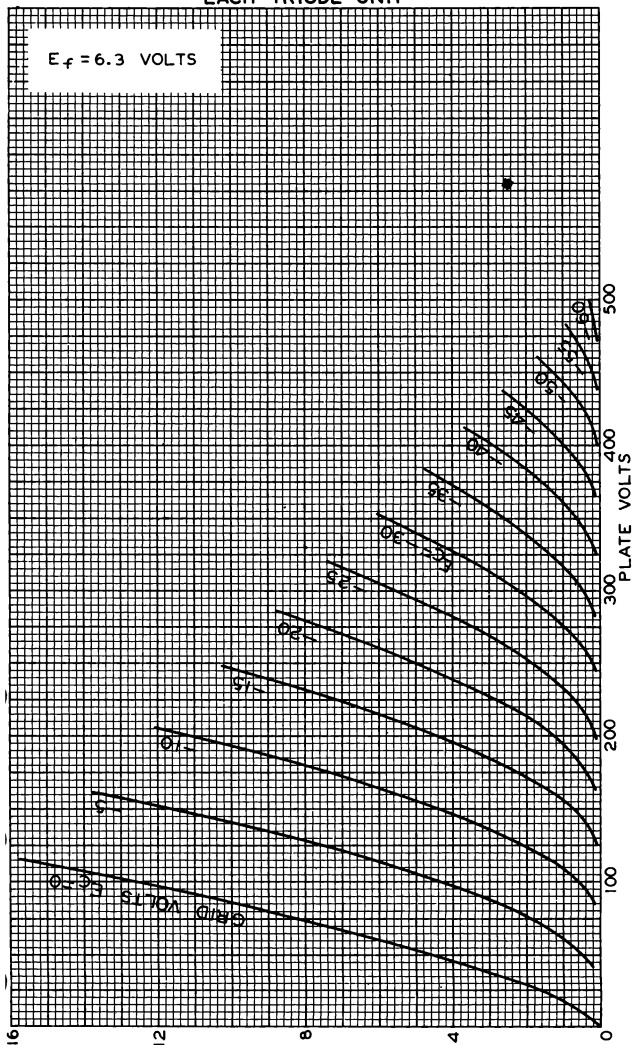
RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA



2C21

AVERAGE PLATE CHARACTERISTICS EACH TRIODE UNIT





2C22

2C22

AMPLIFIER TRIODE

Heater	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.3	amp.
Direct Interelectrode Capacitances: ^o		
Grid to Plate	3.6	$\mu\mu\text{f}$
Grid to Cathode	2.2	$\mu\mu\text{f}$
Plate to Cathode	0.7	$\mu\mu\text{f}$
Overall Length		3-1/8" $\pm$ 1/8"
Seated Height		2-9/16" $\pm$ 1/8"
Maximum Diameter		1-5/16"
Bulb		T-9
Caps (two RCA No.3947)		Skirted Miniature
Base		Intermediate Shell Octal 8-Pin
Mounting Position		Any

*Maximum Ratings Are Design-Center Values*AMPLIFIER

Plate Voltage	300 [•] max. volts
Plate Dissipation	3.3 max. watts

Characteristics - Class A₁ Amplifier:

Plate Voltage	300	volts
Grid Voltage *	-10.5	volts
Amplification Factor	20	
Plate Resistance	6600	ohms
Transconductance	3000	μmhos
Plate Current	11	ma.

- In circuits where the cathode is not directly connected to the heater, the potential difference between heater and cathode should be kept as low as possible.
- With no external shield.
- This value is for Continuous Commercial Service (CCS). In Intermittent Commercial and Amateur Service (ICAS), the plate voltage may be as high as 500 volts maximum, but the maximum plate dissipation remains unchanged.
- * Under maximum rated conditions, the resistance in the grid circuit should not exceed 1.0 megohm.

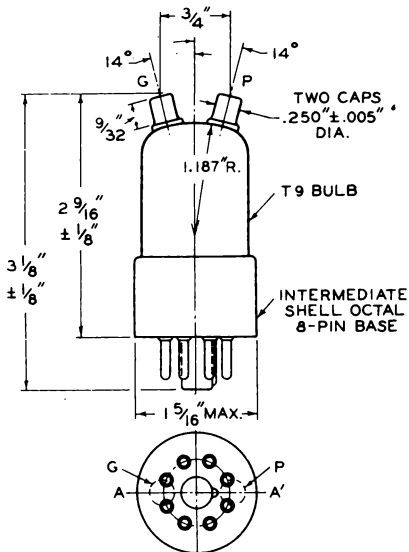
The approximate resonant frequency of the input (grid-cathode) circuit is 335 megacycles.

2C22



2C22

AMPLIFIER TRIODE



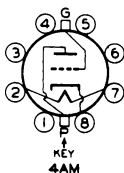
BOTTOM VIEW

NOTE:

THE PLANE PASSING THROUGH THE CENTER OF EITHER CAP, PERPENDICULAR TO AND THROUGH THE CENTER OF THE BOTTOM OF THE BASE, SHALL NOT DEVIATE MORE THAN $\pm 5^\circ$ FROM THE LINE AA' THROUGH BASE PLUG AXIS AND KEY CENTER.

92C-6427

BOTTOM VIEW OF SOCKET CONNECTIONS



- Pin 1 - No Connection
- Pin 2 - Heater
- Pin 3 - No Connection
- Pin 4 - No Connection
- Pin 5 - No Connection
- Pin 6 - No Connection
- Pin 7 - Heater
- Pin 8 - Cathode
- Cap above Pins 1 & 8 - Plate
- Cap above Pins 4 & 5 - Grid

Mar. 20, 1943

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

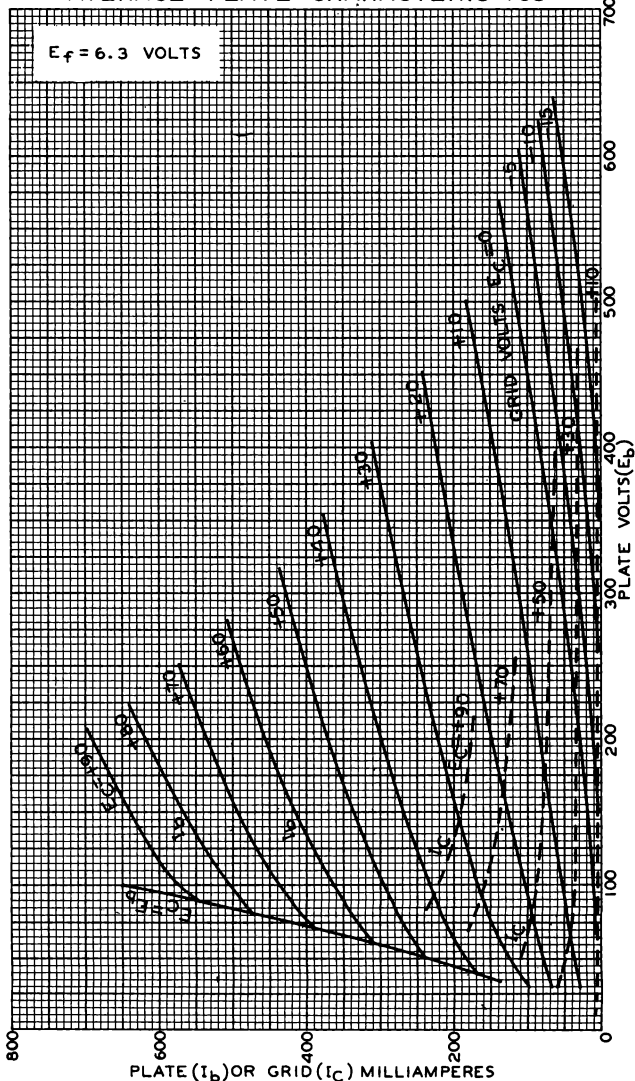
CE-5427



2C22

2C22

AVERAGE PLATE CHARACTERISTICS



FEB. 23, 1943

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA HARRISON, NEW JERSEY

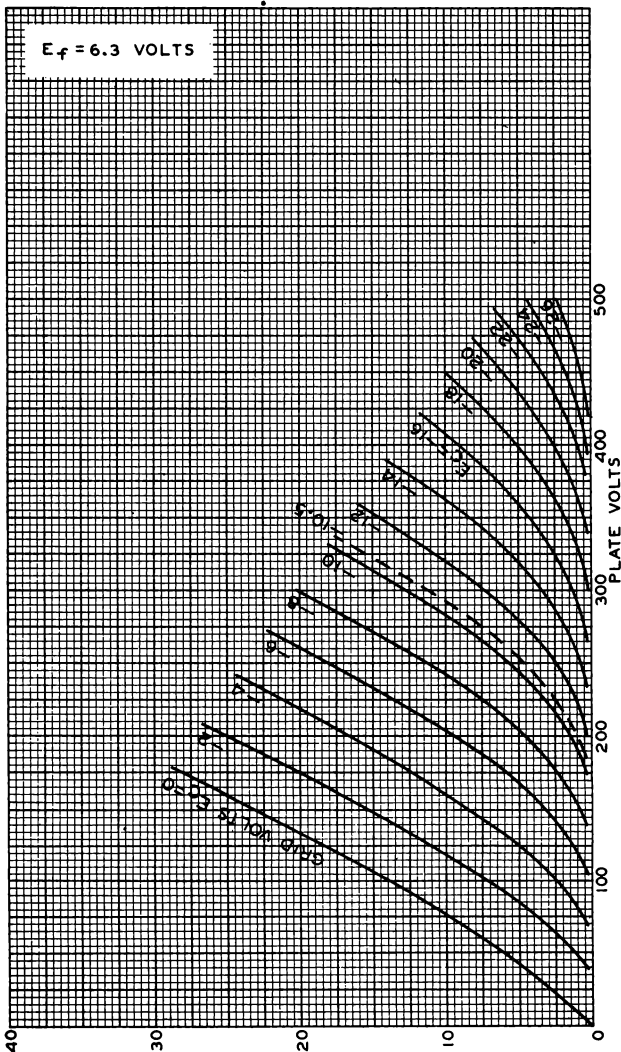
92C-6437

2C22



2C22

AVERAGE PLATE CHARACTERISTICS



FEB. 22, 1943

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92C-6436



2C40

2C40

LIGHTHOUSE TRIODE

Supersedes Types 446-A and 446-B in Military Equipment

GENERAL DATA

Electrical:

Heater for Unipotential Cathode:

Voltage. 6.3 $\pm$ 5% ac or dc volts

Current. 0.75 amp.

Direct Interelectrode Capacitances:

Grid to Plate* 1.3 μmf Grid to Cathode* 2.1 μmf Plate to Cathode*^A 0.02 μmf Cathode to Shell 100 approx. μmf Characteristics, Class A₁ Amplifier:

DC Plate Voltage 250 . . . volts

Cathode-Bias Resistor** 200 . . ohms

Amplification Factor 36 . . .

Plate Resistance 7500 . . . ohms

Transconductance 4800 . . μmhos

Plate Current 16.5 . . . ma.

Mechanical:

Operating Position Any

Mounting Tube should be supported by its metal shell and not by its base or other terminals

Dimensions and Terminals See Outline Drawing

Base Small H-Wafer Octal 6-Pin

BOTTOM VIEW

Pin 1—Internal Con.
Do Not Use

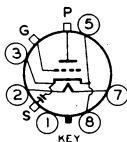
Pin 2—Heater

Pin 3—Cathode

Pin 5—Cathode

Pin 7—Heater

Pin 8—Cathode



Shell (S)	{ Cathode
Center	
Disc (G)	{ Grid
Post & End Disc (P)	
	{ Plate

RF AMPLIFIER & OSCILLATOR — Class C Telegraphy

Maximum Ratings, Design-Center Values:

DC PLATE VOLTAGE 450 max. volts

DC PLATE CURRENT 22 max. volts

PLATE DISSIPATION 5 max. watts

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode . . 90 max. volts

Heater positive with respect to cathode . . 90 max. volts

PLATE-SEAL TEMPERATURE[#] 150 max. °C

* With cathode connected directly to shell.

** Fixed bias is not recommended.

^A With shield having diameter of 2-3/8" in plane of grid disc terminal.[#] Under extremely high ambient temperatures, the plate-seal temperature must never exceed 200°C.

Nov. 15, 1945

RCA VICTOR DIVISION

TENTATIVE DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

2C40



2C40

LIGHTHOUSE TRIODE

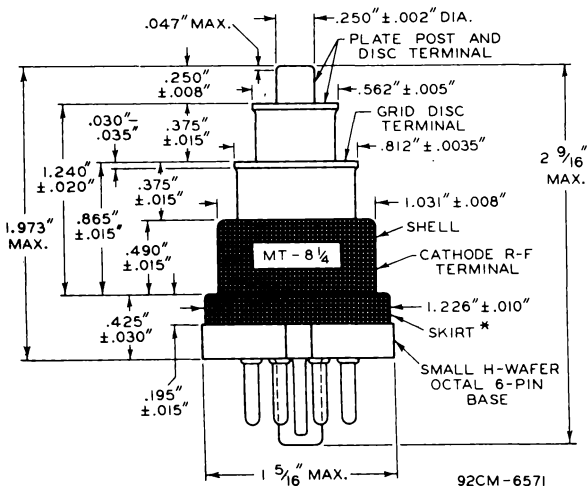


PLATE POST, GRID DISC TERMINAL, AND CATHODE RF TERMINAL ARE CONCENTRIC WITH RESPECT TO EACH OTHER WITHIN 1/64".

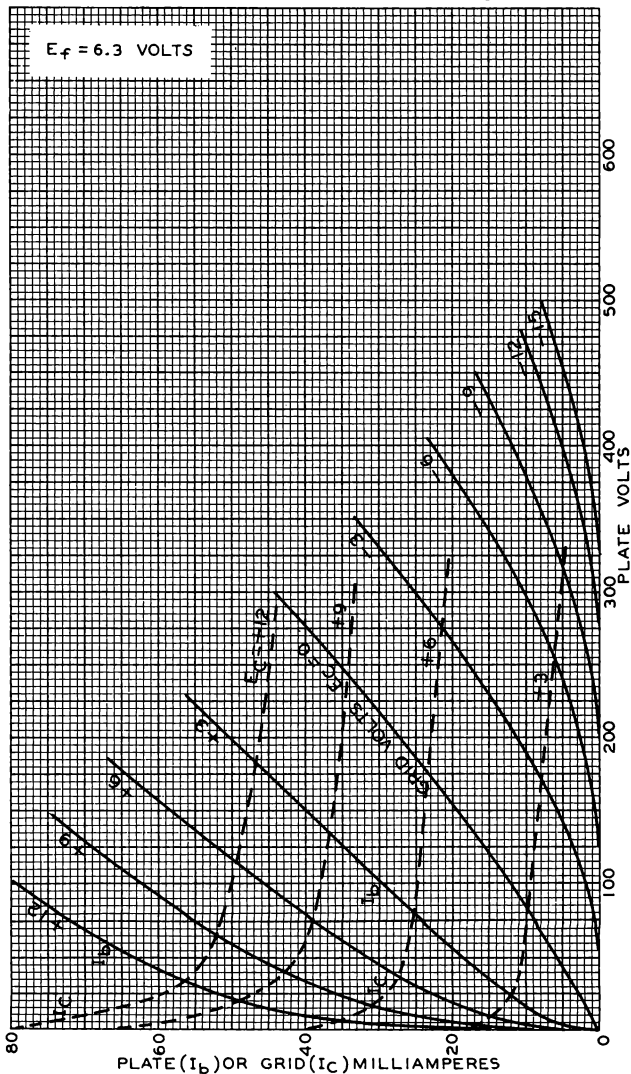
* NOT TO BE USED FOR RF CONTACT IN NEW EQUIPMENT DESIGNS.



2C40

2C40

AVERAGE PLATE CHARACTERISTICS



MAR. 3, 1945

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6507



2C43

2C43

LIGHTHOUSE TRIODE

GENERAL DATA

Electrical:

Heater for Unipotential Cathode:

Voltage $6.3 \pm 5\%$ ac or dc volts
 Current 0.9 amp.

Direct Interelectrode Capacitances:

Grid to Plate* 1.7 μmf
 Grid to Cathode* 2.8 μmf
 Plate to Cathode* Δ 0.02 μmf
 Cathode to Shell 100 approx. μmf

Characteristics, Class A₁ Amplifier:

DC Plate Voltage 250 volts
 Cathode-Bias Resistor** 100 ohms
 Amplification Factor 48
 Plate Resistance 6000 Ω ohms
 Transconductance 8000 μmhos
 Plate Current 20 ma.

Mechanical:

Operating Position Any
 Mounting Tube should be supported by its metal shell
 and not by its base or other terminals

Dimensions and Terminals See Outline Drawing

Base Small H-Wafer Octal 6-Pin

BOTTOM VIEW

Pin1 - Internal Con.
 Do Not Use

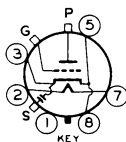
Pin2 - Heater

Pin3 - Cathode

Pin5 - Cathode

Pin7 - Heater

Pin8 - Cathode



Shell } { Cathode
 (S) } { RF Terminal
 Center }
 Disc } { Grid
 (G) } { Terminal
 Post & }
 End } { Plate
 Disc(P) } { Terminal

RF AMPLIFIER & OSCILLATOR - Class C Telegraphy

Maximum Ratings, Design-Center Values:

DC PLATE VOLTAGE 450 max. volts

DC PLATE CURRENT 36 max. ma.

PLATE DISSIPATION 10 max. watts

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode . . 90 max. volts

Heater positive with respect to cathode . . 90 max. volts

PLATE-SEAL TEMPERATURE $\#$ 150 max. $^{\circ}\text{C}$

* With cathode connected directly to shell.

** Fixed bias is not recommended.

 Δ With shield having diameter of 2-3/8" in plane of grid disc terminal. $\#$ Under extremely high ambient temperatures, the plate-seal temperature must never exceed 200°C .

Nov. 15, 1945

RCA VICTOR DIVISION

TENTATIVE DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

2C43



2C43

LIGHTHOUSE TRIODE

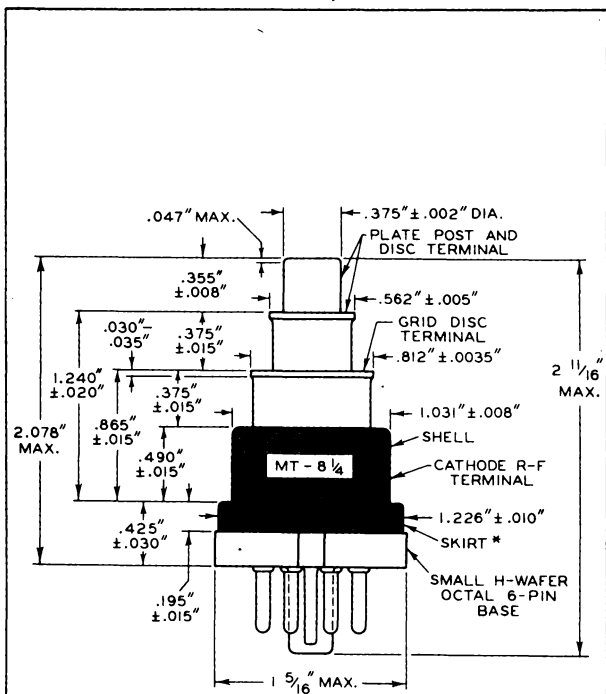


PLATE POST, GRID DISC TERMINAL, AND CATHODE RF TERMINAL ARE CONCENTRIC WITH RESPECT TO EACH OTHER WITHIN 1/64".

*NOT TO BE USED FOR RF CONTACT IN NEW EQUIPMENT DESIGNS.

Nov. 15, 1945

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

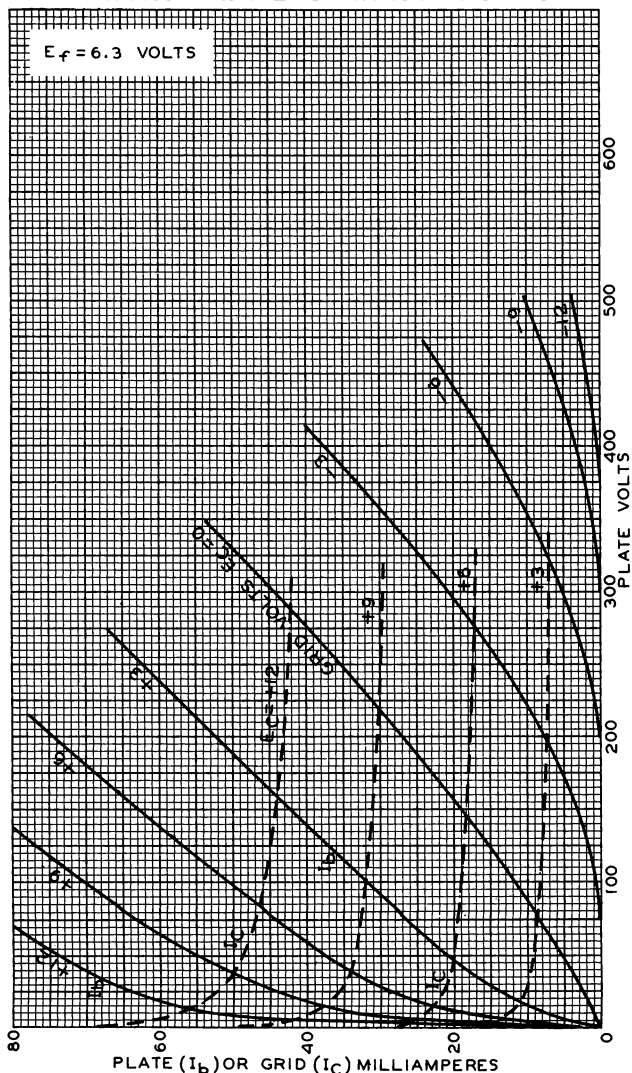
TENTATIVE DATA



2C43

2C43

AVERAGE PLATE CHARACTERISTICS



MAR. 5, 1945

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6508



2J4I

MAGNETRON

FREQUENCY-STABILIZED TYPE

Tunable: 9300-9320 Mc

2J4I

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathode:

Voltage. $5 \pm 10\%$ ac or dc volts

Current. 0.36 amp

Minimum Cathode Heating Time 1 minute

Frequency. 9310 Mc

Frequency Range. $\begin{cases} 9320 \text{ max.} \\ 9300 \text{ min.} \end{cases}$ Mc

Maximum Pulling Frequency:

At 9300 Mc 2.5 Mc

At 9310 Mc 1.5 Mc

At 9320 Mc 2.5 Mc

Maximum Frequency Change with Anode

Stud Temperature Change. 0.025 Mc/°C

Mechanical:

Mounting Position. Any

Dimensions See Dimensional Outline

Weight (Approx.) 7-1/2 lbs

Mating Output RF Connector MIL Type UG-40/U

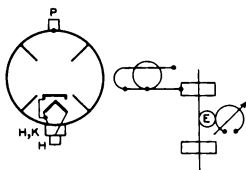
Base Short Skirted Miniature Double Bayonet

Terminal Connections (See Dimensional Outline):

H - Heater

K - Cathode

P - Anode

**PULSED OSCILLATOR SERVICE****Maximum and Minimum Ratings, Absolute Values:**

For Duty Cycle of 0.003 max.

PEAK ANODE VOLTAGE 3000 max. volts

PEAK ANODE CURRENT $\begin{cases} 1.2 \text{ max.} \\ 0.8 \text{ min.} \end{cases}$ amp

PEAK POWER INPUT 3.6 max. kw

AVERAGE POWER INPUT. 10.8 max. watts

PULSE DURATION 0.6 max. μ sec

OPERATION TIME IN ANY 100-

MICROSECOND INTERVAL 3 max. μ sec

AMBIENT TEMPERATURE. 85 max. °C

ABSOLUTE PRESSURE ON WAVEGUIDE WINDOW. 30 max. psi

LOAD VOLTAGE STANDING-WAVE RATIO 1.5 max.

TIME OF RISE OF VOLTAGE PULSE. 0.2 max. μ sec



241



CE-8654B



2K26 KLYSTRON

SINGLE-RESONATOR, REFLEX TYPE
Frequency: 6250 to 7060 Mc.

2K26

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

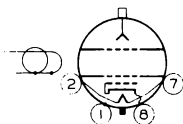
Voltage. 6.3 ± 0.5 ac or dc volts
Current. 0.44 amp
Frequency Range. . . . 6250 to 7060 Mc

Mechanical:

Mounting Position. Any
Dimensions, Terminal Connections,
and Mechanical Tuning Mechanism. . . . See Outline Drawing
Resonant Cavity. Integral Part of Tube
Envelope Metal
Cap. Miniature with Wafer
Base Small-Wafer Octal 4-Pin with Pin No.4
replaced by Coaxial Output Line

BOTTOM VIEW

Pin 1 - Shell,
Resonator



Pin 7 - Heater
Pin 8 - Cathode

Pin 2 - Heater

Cap - Reflector
Terminal

NOTE: COAXIAL OUTPUT LINE PASSES THROUGH
VACANT PIN POSITION NO. 4

CW OSCILLATOR - Class C

Maximum Ratings, Absolute Values:

DC RESONATOR VOLTAGE 330 max. volts
DC REFLECTOR VOLTAGE:
Positive Value 0 max. volts
Negative Value 350 max. volts
DC RESONATOR CURRENT 35 max. ma
PEAK HEATER-CATHODE VOLTAGE:
Heater negative with respect to cathode. 50 max. volts
Heater positive with respect to cathode. 50 max. volts
AMBIENT TEMPERATURE OF SHELL 110 max. °C
TEMPERATURE OF COAXIAL OUTPUT LINE 90 max. °C

Typical Operation [□] at 6660 Mc in Mode "A" with 3/4" x 1-1/2" Wave Guide

DC Resonator Voltage 300 volts
DC Reflector Voltage Range [▲] -65 to -120 volts
DC Resonator Current 25 ma
DC Reflector Current less than 7 μ a

(continued on next page)

[□], [▲]: See next page.

NOV. 15, 1948

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA 1

2K26



2K26 KLYSTRON

Half-Power Electronic-Tuning

Frequency Change [▲]	55	Mc
Power Output	120	mw

- ▲ Adjusted for maximum power output at the given operating frequency.
- Change in frequency between the two half-power points when the reflector voltage is varied above and below the point of maximum power output corresponding to the given frequency.
- The coaxial output line is coupled to the specified wave guide through the wide-band coaxial coupling unit shown on following pages.

INSTALLATION NOTES

A socket for the 2K26 may be obtained by removing the clip from the No.4 pin position of an octal socket and drilling the No.4 opening large enough to admit the coaxial line and the surrounding coupling unit. To guard against excessive strain on the coaxial output line, the tube must be securely fastened by a clamp on the base of the socket mounting. Bumping or continued pressure on the output line will seriously damage the tube. The proper area for clamping on the shoulder of the header skirt is shown on the Outline Drawing.



2K26

KLYSTRON

2K26

OPERATING NOTES

All tabulated data and curve information shown for the 2K26 were taken with the specified coupling unit and wave guide. It is important that this coupling unit or its electrical equivalent be used to insure tube interchangeability and satisfactory tuning characteristics. In addition, the standing-wave ratio of the coupler should not exceed 0.8 db. (1.1 voltage-standing-wave ratio).

In most applications the cathode of the 2K26 is operated at a negative potential with respect to ground so that the tube shell, which is integral with the resonator, is at ground potential. In those applications which do not operate with the shell at ground potential, it is essential that the 2K26 be surrounded by a grounded shield and tuned with an insulated tool, in order to protect the user from contact with high voltage. The shield design should permit adequate ventilation to assure that ambient temperature, as measured with a thermometer inserted between the metal tube shell and the shield, will be less than the maximum rated value. Ambient temperature changes will cause the resonator to expand or contract, producing a change in frequency. For best frequency stability, the 2K26 should be operated at nearly constant ambient temperature and with a well-regulated power supply.

Shielding of the reflector and resonator voltage leads as close to the tube as possible is essential to avoid modulation of the tube output by any external voltages. In addition, the connection to the reflector terminal must be insulated to withstand the total acceleration and reflector voltage. To avoid damage to the tube, the reflector potential must never become positive with respect to the cathode.

Tuning of the 2K26 is accomplished by mechanical and electronic means. The mechanical tuning system is designed to permit approximate adjustment of frequency, but is not recommended for use where continual or frequent adjustment of frequency is required. Approximately five full turns of the frequency-adjustment screw are sufficient to tune the tube over its rated frequency range. The electronic tuning range is dependent upon reflector voltage, the type of load and the kind of coupling to the load.

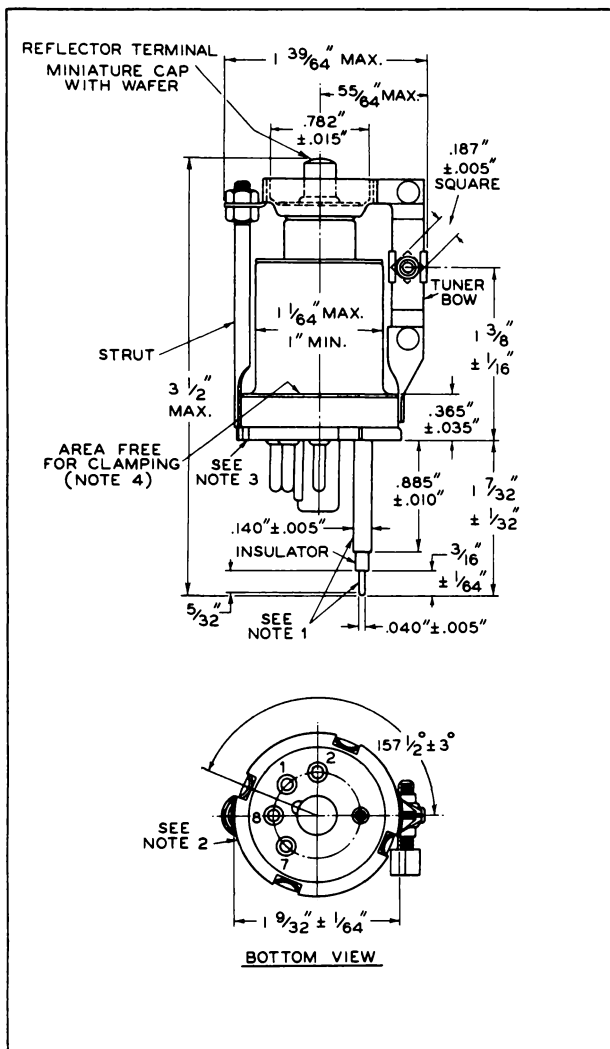
Voltage modes are regions within the total range of reflector voltage in which oscillations will occur. The typical operating conditions and curves shown for type 2K26 apply to mode "A", the only mode recommended for this tube.

2K26



2K26

KLYSTRON



NOV. 15, 1948

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

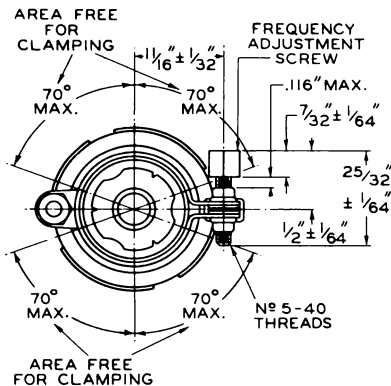
CE-6986VA



2K26

KLYSTRON

2K26

TOP VIEW

NOTE 1: THE INNER AND OUTER CONDUCTORS OF THE COAXIAL OUTPUT LINE ARE CONCENTRIC WITHIN 0.010".

NOTE 2: BASE-PIN AND COAXIAL-OUTPUT-LINE POSITIONS ARE HELD TO TOLERANCES SUCH THAT PINS AND OUTPUT LINE WILL FIT FLAT-PLATE GAUGE HAVING (a) THICKNESS OF 1-7/32", (b) 4 HOLES WITH DIAMETER OF 0.1030" $\pm$ 0.0005" FROM TOP SURFACE OF GAUGE TO A DEPTH OF 0.25" AND THEN WITH DIAMETER INCREASED BY APPROXIMATELY 1/64" FOR REMAINING DEPTH OF HOLE, SO LOCATED ON A 0.6870" $\pm$ 0.0005" DIAMETER CIRCLE THAT THE DISTANCE ALONG THE CHORD BETWEEN ANY TWO ADJACENT HOLE CENTERS IS 0.2630" $\pm$ 0.0005", (c) ONE HOLE WITH DIAMETER OF 0.1600" $\pm$ 0.0005" TO DEPTH OF 1-7/32" WHOSE CENTER IS LOCATED ON THE SPECIFIED PIN CIRCLE A DISTANCE DETERMINED BY LAYING OFF ON THE TOP SURFACE OF THE GAUGE COUNTERCLOCKWISE FROM THE LAST OF THE FOUR HOLES TWO CONSECUTIVE CHORDS EACH 0.2630" $\pm$ 0.0005", AND (d) A CENTER HOLE WITH A MINIMUM DIAMETER OF 0.400" TO CLEAR THE BASE PLUG AND KEY. PIN AND OUTPUT-LINE FIT IN GAUGE SHALL BE SUCH THAT GAUGE TOGETHER WITH SUPPLEMENTARY WEIGHT TOTALING 2 LBS. WILL NOT BE LIFTED WHEN PINS AND COAXIAL OUTPUT LINE ARE WITHDRAWN.

NOTE 3: SMALL-WAFER OCTAL 4-PIN BASE WITH PIN No. 4 REPLACED BY COAXIAL OUTPUT LINE.

NOTE 4: MINIMUM WIDTH OF SHOULDER IS 0.045".

2K26

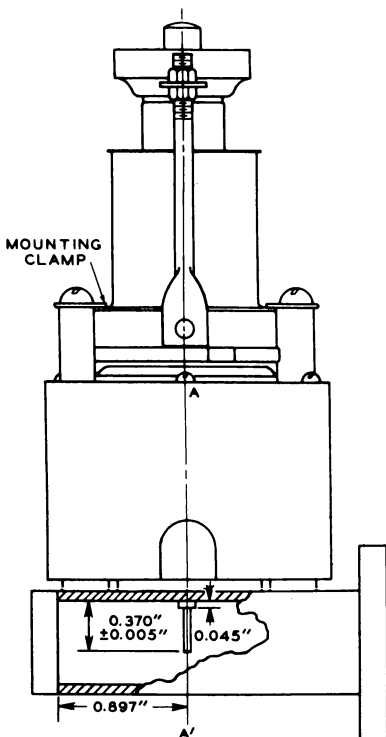


2K26

KLYSTRON

COUPLING ARRANGEMENT

*RCA-2K26 Coupled to a 3/4" x 1-1/2" Wave Guide
Through a Coaxial Transducer Coupling
Circuit*



NOV. 15, 1948

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-7008VA

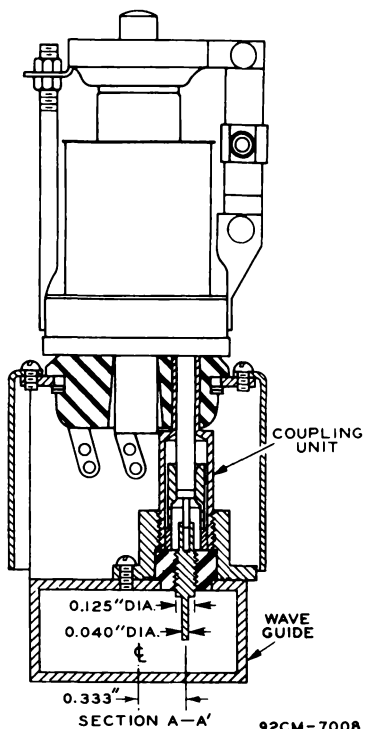


2K26

KLYSTRON

2K26

COUPLING ARRANGEMENT (Cont'd)



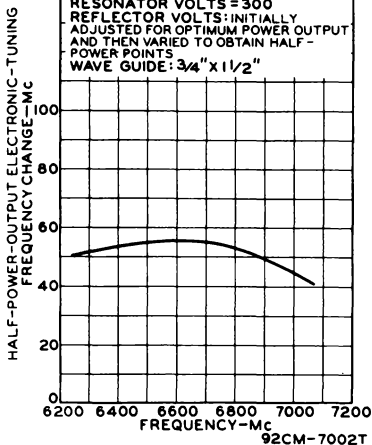
2K26



2K26 KLYSTRON

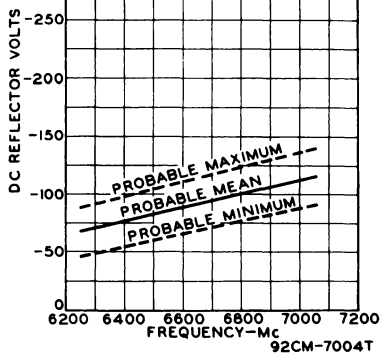
OPERATION CHARACTERISTIC

TYPE 2K26
OPERATING MODE: "A"
RESONATOR VOLTS = 300
REFLECTOR VOLTS: INITIALLY
ADJUSTED FOR OPTIMUM POWER OUTPUT
AND THEN VARIED TO OBTAIN HALF-
POWER POINTS
WAVE GUIDE: $3/4" \times 1 1/2"$



OPERATION CHARACTERISTIC

TYPE 2K26
OPERATING MODE: "A"
RESONATOR VOLTS = 300
WAVE GUIDE: $3/4" \times 1 1/2"$



NOV. 15, 1948

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

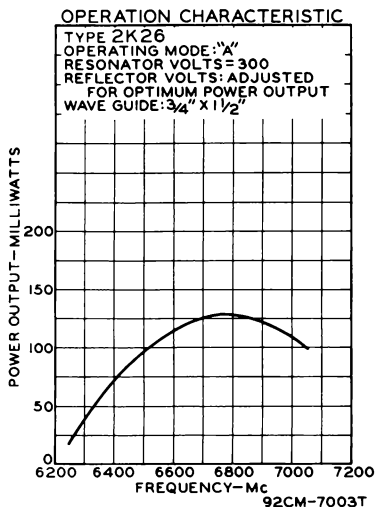
CE-7002T-7004T



2K26

KLYSTRON

2K26



NOV. 15, 1948

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-7003T



2K56

Delete

2K56

KLYSTRON

SINGLE-RESONATOR, REFLEX TYPE

Frequency: 3840 to 4460 Mc.

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathode:

Voltage. 6.3 $\pm$ 0.5 ac or dc volts

Current. 0.44 amp

Frequency Range. 3840 to 4460 Mc

Mechanical:

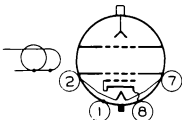
Mounting Position. Any

Dimensions, Terminal Connections,
and Mechanical Tuning Mechanism. See Outline Drawing

Resonant Cavity. Integral Part of Tube

Envelope Metal

Cap. Miniature with Wafer

Base Small-Wafer Octal 4-Pin with Pin No.4
replaced by Coaxial Output LineBOTTOM VIEWPin 1 - Shell,
ResonatorPin 7 - Heater
Pin 8 - Cathode

Pin 2 - Heater

Cap - Reflector
TerminalNOTE: COAXIAL OUTPUT LINE PASSES THROUGH
VACANT PIN POSITION NO.4CW OSCILLATOR - Class C**Maximum Ratings, Absolute Values:**

DC RESONATOR VOLTAGE 330 max. volts

DC REFLECTOR VOLTAGE:

Positive Value 0 max. volts

Negative Value 400 max. volts

DC RESONATOR CURRENT 37 max. ma

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode. 50 max. volts

Heater positive with respect to cathode. 50 max. volts

AMBIENT TEMPERATURE OF SHELL 110 max. °C

TEMPERATURE OF COAXIAL OUTPUT LINE 90 max. °C

Typical Operation [□] at 4150 Mc in Mode "A"

with 1" x 2" Wave Guide

DC Resonator Voltage 300 volts

DC Reflector Voltage Range[▲] -85 to -150 volts

DC Resonator Current 25 ma

DC Reflector Current less than 7 μ a

(continued on next page)

[□], [▲]: See next page.

NOV. 15, 1948

TUBE DEPARTMENT

TENTATIVE DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

2K56



2K56 KLYSTRON

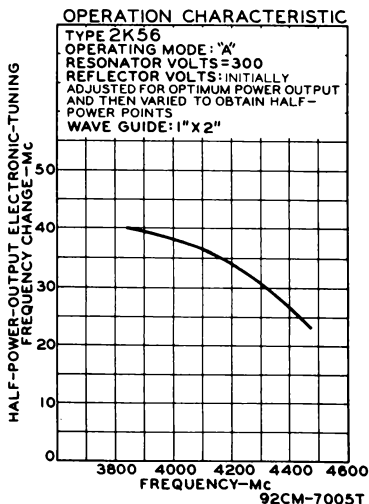
Half-Power Electronic-Tuning

Frequency Change [▲]	35	Mc
Power Output	90	mw

- ▲ Adjusted for maximum power output at the given operating frequency.
 ■ Change in frequency between the two half-power points when the reflector voltage is varied above and below the point of maximum power output corresponding to the given frequency.
 □ The coaxial output line is coupled to the specified wave guide through the wide-band coaxial coupling unit shown on the following pages.

INSTALLATION and OPERATING NOTES for the 2K56 are the same as those shown for the 2K26, except that consideration should be given to the different coupling unit and wave guide required for the 2K56.

OUTLINE DIMENSIONS for Type 2K56 are the same as those for Type 2K26



NOV. 15, 1948

TUBE DEPARTMENT

CE-7005T

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



2K56

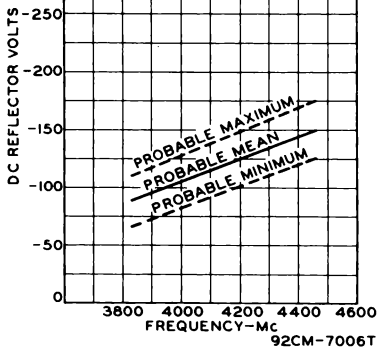
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2K56

KLYSTRON

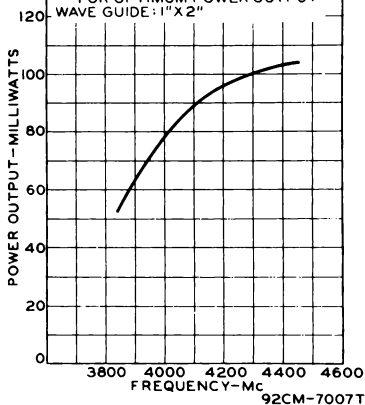
OPERATION CHARACTERISTIC

TYPE 2K56
OPERATING MODE: "A"
RESONATOR VOLTS = 300
WAVE GUIDE: 1" X 2"



OPERATION CHARACTERISTIC

TYPE 2K56
OPERATING MODE: "A"
RESONATOR VOLTS = 300
REFLECTOR VOLTS: ADJUSTED
FOR OPTIMUM POWER OUTPUT
WAVE GUIDE: 1" X 2"



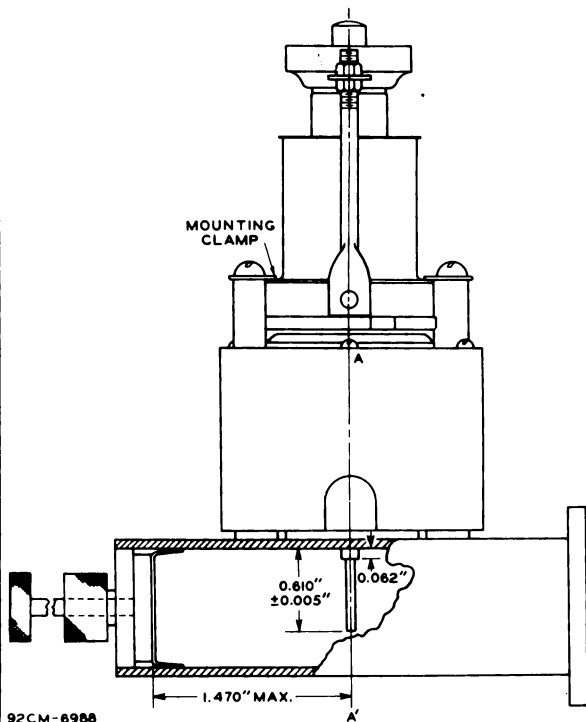
2K56



2K56 KLYSTRON

COUPLING ARRANGEMENT

*RCA-2K56 Coupled to a 1" x 2" Wave Guide
Through a Coaxial Transducer Coupling
Circuit*





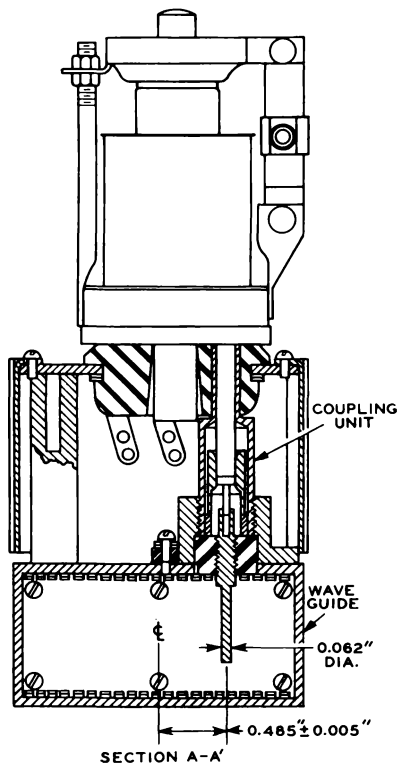
2K56

2K56

2K56

KLYSTRON

COUPLING ARRANGEMENT (Cont'd)





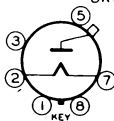
2V3-G

2V3-G

HALF-WAVE HIGH-VACUUM RECTIFIER

FOR USE WITH CATHODE-RAY TUBES

Filament	Tungsten	
Voltage *	2.5	a-c volts
Current	5	amp.
Maximum Overall Length		4-15/32"
Maximum Diameter		1-9/16"
Bulb		ST-12
Cap		Skirted Miniature - Style A
Base		Small Shell Octal 6-Pin
Pin 1 - No Connection		Pin 7 - Filament
Pin 2 - Filament		Pin 8 - No Connection
Pin 3 - No Connection		Cap - Plate
Pin 5 - No Connection		
Mounting Position		Vertical Only

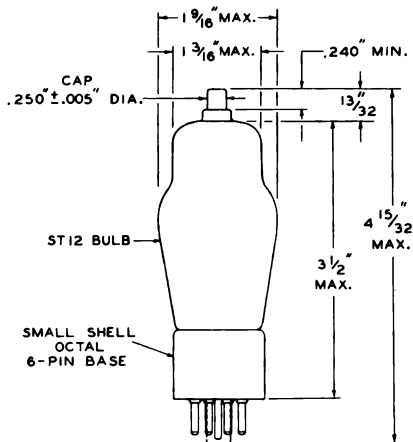


BOTTOM VIEW

MAXIMUM RATINGS

Peak Inverse Voltage	16500 max. volts
Peak Plate Current	12 max. ma.
Average Plate Current	2 max. ma.

* In equipment designed for an average line voltage of 117 volts, the 2V3-G can be operated at line voltages up to 125 volts or as low as 105 volts without serious effect on tube performance and life.



92C-6005 R1

APRIL 3, 1939

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

TENTATIVE DATA

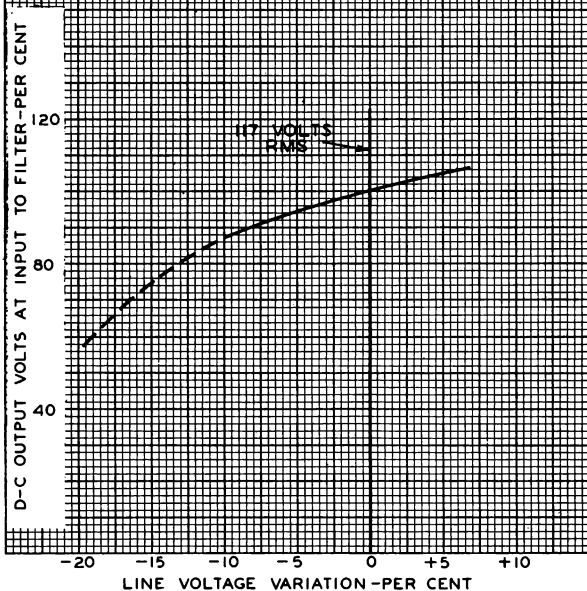
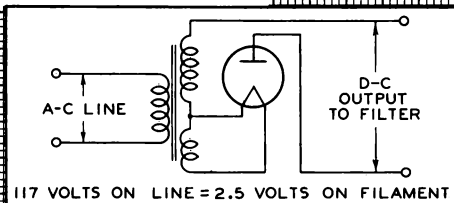
2V3-G



2V3-G

TYPICAL REGULATION CHARACTERISTIC

D-C OUTPUT CURRENT = 2 MA.





2X2-A

HALF-WAVE VACUUM RECTIFIER*For applications critical as to severe shock and vibration***GENERAL DATA****Electrical:**

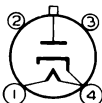
Heater, for Unipotential Cathode:

	Min.	Av.	Max.	
Voltage.	2.25	2.50	2.75	ac volts
Current at 2.50 volts. . .	1.55	1.75	1.95	amp

Mechanical:

Mounting Position.	Any
Maximum Overall Length.	4-17/32" ←
Seated Length.	3-25/32" ± 1/8"
Maximum Diameter.	1-9/16"
Dimensional Outline.	See General Section
Weight (Approx.)	1.3 oz ←
Eulb	ST-12
Cap.	Small (JETEC No.C1-1) ←
Base	Small-Shell Small 4-Pin (JETEC No.A4-5) ←
Basing Designation for BOTTOM VIEW.	4AB

Pin 1 - Heater
 Pin 2 - No Connec-
 tion
 Pin 3 - No Connec-
 tion



Pin 4 - Heater,
 Cathode
 Cap - Plate

HALF-WAVE RECTIFIER**Maximum Ratings, Design-Center Values:**

PEAK INVERSE PLATE VOLTAGE	12500 max.	volts
PEAK PLATE CURRENT	60 max.	ma
DC OUTPUT CURRENT.	7.5 max.	ma
HOT-SWITCHING TRANSIENT CURRENT, for duration of 0.2 second max.	100 max.	ma
AMBIENT TEMPERATURE.	70 max.	OC ←

Typical Operation:

AC Plate-Supply Voltage (RMS).	5500	volts
Total Effective Plate-Supply Impedance . .	0.3	megohm
Filter Input Capacitor	0.1	μf
DC Output Current.	2	ma
DC Output Voltage (At input to filter) . .	4500	volts

SHOCK TEST DATA

Impact Acceleration.	250 max.	g
------------------------------	----------	---

This test is performed on a sample lot of tubes from each production run to determine ability of tube to withstand the specified impact acceleration. The tubes are subjected to a total of 3 blows in each of the 3 primary mutually

← Indicates a change.

SEPT. 1, 1955

TUBE DIVISION**DATA**

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

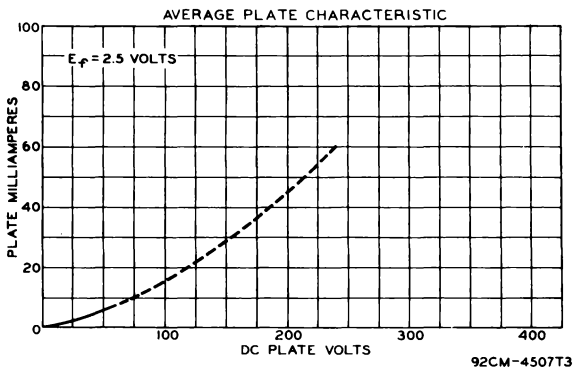
2X2-A



2X2-A

HALF-WAVE VACUUM RECTIFIER

perpendicular tube planes when tested in the Navy Type, High-Impact (flyweight) Shock Machine. At the end of this test, tubes will not show permanent or temporary shorts or open circuits, and will not be inoperative.



SEPT. 1, 1955

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA



3A4

3A4

POWER AMPLIFIER PENTODE

MINIATURE TYPE

Filament	Coated		
Filament Arrangement	<u>Series *</u>	<u>Parallel **</u>	
Voltage	2.8	1.4	d-c volts
Current	0.1	0.2	amp.
Direct Interelectrode Capacitances:°			
Grid to Plate	0.34	max.	μpf
Input	4.8		μpf
Output	4.2		μpf
Maximum Overall Length			2-1/8"
Maximum Seated Height			1-7/8"
Maximum Diameter			3/4"
Bulb			T-5-1/2
Base▲			Miniature Button 7-Pin
Pin 1-Fil. (- series)			Pin 5 { Fil. Mid-Tap
Pin 2-Plate			Pin 6 (- parallel)
Pin 3-Screen			Pin 6-Plate
Pin 4-Grid			Pin 7-Filament. +
RCA Socket			Stock No. 9914
Mounting Position	BOTTOM VIEW (7BB)		Any



Maximum Ratings Are Design-Center Values

A-F POWER AMPLIFIER

Plate Voltage	150 max.	volts
Screen Voltage	90 max.	volts
Plate Dissipation	2.0 max.	watts
Screen Dissipation	0.4 max.	watt
Total Zero-Sig. Cathode Current■	18 max.	ma.

Typical Operation and Characteristics-Class A₁ Amplifier:●

Filament Arrangement	<u>Parallel **</u>		
Plate Voltage	135	150	volts
Screen Voltage	90	90	volts
Grid Voltage	-7.5	-8.4	volts
Peak A-F Grid Voltage	7.5	8.4	volts
Zero-Sig. Plate Current	14.8	13.3	ma.
Max.-Sig. Plate Current	14.9	14.1	ma.
Zero-Sig. Screen Current	2.6	2.2	ma.
Max.-Sig. Screen Current	3.5	3.5	ma.
Plate Resistance	90000	100000	ohms
Transconductance	1900	1900	μmhos
Load Resistance	8000	8000	ohms
Total Harmonic Distortion	5	6	%
Max.-Sig. Power Output	600	700	mw

R-F POWER AMPLIFIER

D-C Plate Voltage	150 max.	volts
D-C Screen Voltage	135 max.	volts
D-C Grid Voltage	-30 max.	volts
D-C Plate Current	20 max.	ma.
D-C Grid Current	0.25 max.	ma.
Total D-C Cathode Current ■	25 max.	ma.
Plate Input	3 max.	watts
Screen Input	0.9 max.	watt
Plate Dissipation	2 max.	watts

*, **, °, ▲, ■, ●: See next page.

← indicates a change.

DEC. 15, 1944

RCA VICTOR DIVISION

DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

3A4



3A4

POWER AMPLIFIER PENTODE

(continued from preceding page)

➤ Typical Operation at 10 Mc with

Parallel Filament Arrangement:**

D-C Plate Voltage	150	volts
D-C Screen Voltage	135	volts
Grid Resistor	0.2	megohm
D-C Plate Current	18.3	ma.
D-C Screen Current	6.5	ma.
D-C Grid Current	0.13	ma.
Power Output (approx.)	1.2	watts

* Filament voltage applied across the two sections in series between pins No.1 and No.7. Grid voltage is referred to pin No.1.

** Filament voltage applied across the two sections in parallel between pin No.5 and pins No.1 and No.7 connected together. Grid voltage is referred to pin No.5.

○ With no external shield.

■ For series-filament operation. A shunting resistor must be connected across the section between pins No.1 and No.5 to by-pass excess cathode current in this section. The value of the shunting resistor should be adjusted to make the voltage across the shunted section equal to the voltage across the section between pins No.5 and No.7. When other tubes in series-filament arrangement contribute to the filament current of the 3A4, an additional shunting resistor may be required between pins No.1 and No.7.

● Typical operating values for the 3A4 with filament sections in series will be approximately the same as those shown for parallel-filament operation.

▲ The center hole in sockets designed for this base provides for the possibility that this tube type may be manufactured with the exhaust-tube tip at the base end. For this reason, it is recommended that in equipment employing this tube type, no material be permitted to obstruct the socket hole.

← Indicates a change.

DEC. 15, 1944

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

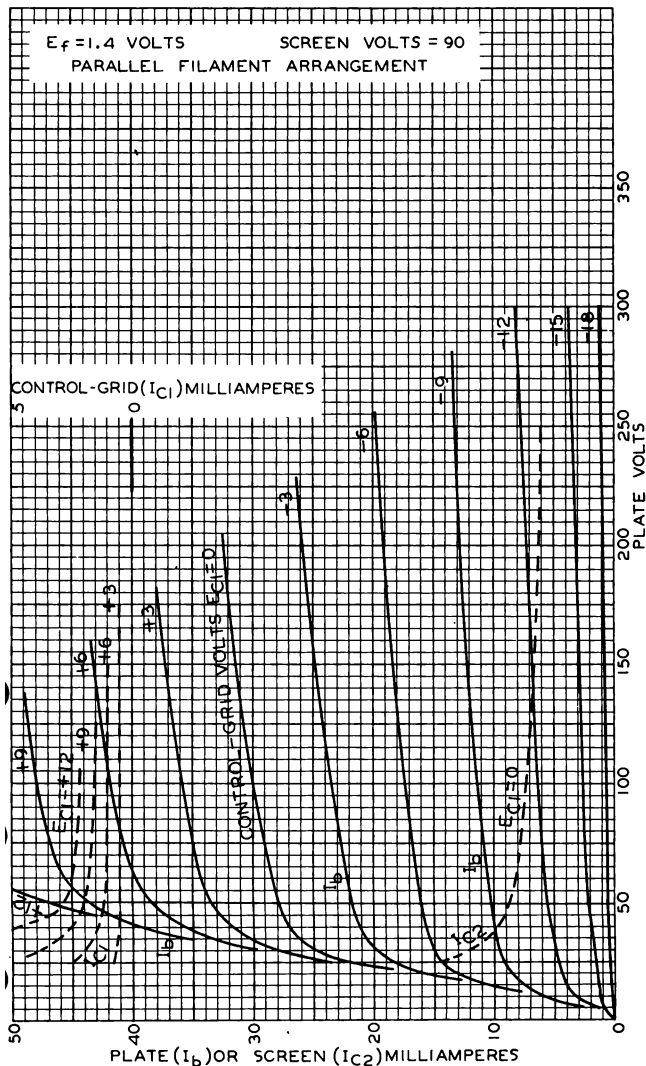
DATA



3A4

3A4

AVERAGE PLATE CHARACTERISTICS



FEB. 19 1942

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6370



3A5

3A5

H-F TWIN TRIODE MINIATURE TYPE

Filament	Coated		
Filament Arrangement	<u>Series*</u>	<u>Parallel**</u>	
Voltage	2.8	1.4	d-c volts
Current	0.11	0.22	amp.
Direct Interelectrode Capacitances:°			
	<u>Triode Unit T₁</u>	<u>Triode Unit T₂</u>	
Grid to Plate	3.2	3.2	μuf
Grid to Filament	0.9	0.9	μuf
Plate to Filament	1.0	1.0	μuf
Plate to Plate		0.32	μuf
Maximum Overall Length			2-1/8"
Maximum Seated Height			1-7/8"
Maximum Diameter			3/4"
Bulb			T-5-1/2"

Base▲

- Pin 1 - Filament -
- Pin 2 - Plate T₂
- Pin 3 - Grid T₂
- Pin 4 - { Fil. Mid-Tap
(+ parallel)



Miniature Button 7-Pin

- Pin 5 - Grid T₁
- Pin 6 - Plate T₁
- Pin 7 - Fil. (+ Series)

RCA Socket

Mounting Position

BOTTOM VIEW (7BC)

Stock No.9914

Any

For convenience, one triode unit is identified as T₁; the other as T₂.

Maximum Ratings Are Design-Center Values

A-F POWER AMPLIFIER

Plate Voltage	135 max. volts
Plate Current	5 max. ma.
Plate Dissipation	0.5 max. watt

Characteristics - Class A₁ Amplifier:

Plate Voltage	90	volts
Grid Voltage	-2.5	volts
Amplification Factor	15	
Plate Resistance	8300	ohms
Transconductance	1800	μmhos
Plate Current	3.7	ma.

R-F POWER AMPLIFIER & OSCILLATOR - Class C Telegraphy

Key-down conditions per tube without modulation

D-C Plate Voltage	135 max. volts
D-C Grid Voltage	-30 max. volts
D-C Plate Current (per unit)	15 max. ma.
D-C Grid Current (per unit)	2.5 max. ma.
Plate Input (per unit)	2.0 max. watts
Plate Dissipation (per unit)	1.0 max. watt

Typical Operation At 40 Mc With Both Units In Push-Pull:

D-C Plate Voltage	135	volts
D-C Grid Voltage ●	{ -20	volts
	{ 4000	ohms
	{ 570	ohms
Peak R-F Grid-to-Grid Voltage	90	volts
D-C Plate Current	30	ma.
D-C Grid Current (approx.)	5	ma.
Driving Power (approx.)	0.2	watt
Power Output (approx.)	2	watts

*, **, °, ●, ▲, : see next page

June 1, 1942

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

TENTATIVE DATA

3A5



3A5

H-F TWIN TRIODE

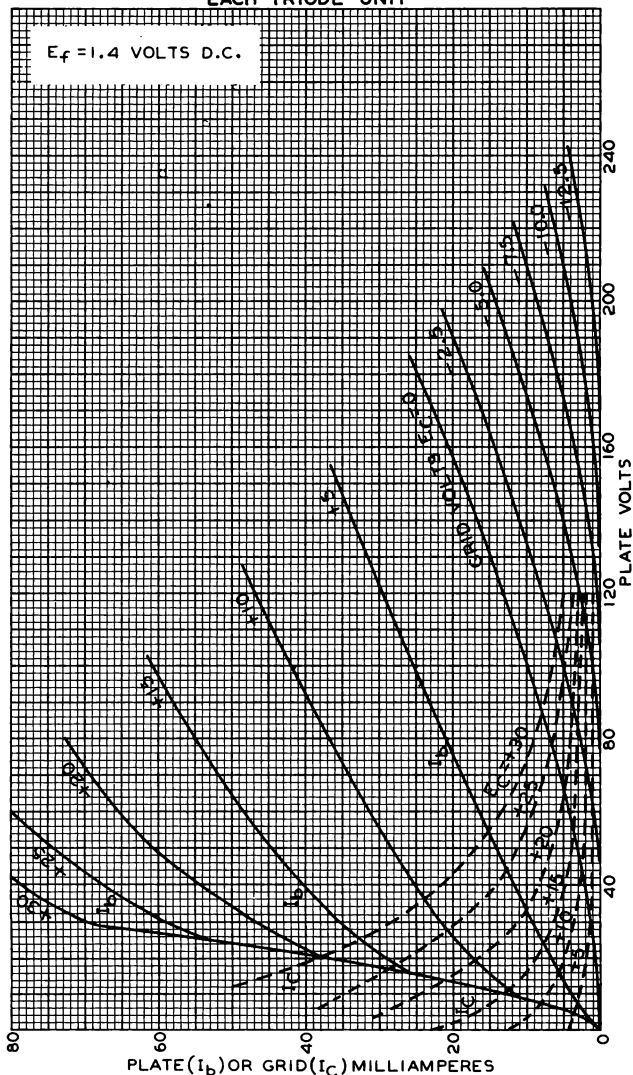
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- * Filament voltage applied across the two sections in series between pins No. 1 and No. 7. Grid voltage is referred to Pin No. 1. For series filament operation, a shunting resistor must be connected across the section between pins No. 1 and No. 4, to by-pass excess cathode current in this section. The value of the shunting resistor should be adjusted to make the voltage across the shunted section equal to the voltage across the section between pins No. 4 and No. 7. When other tubes in series-filament arrangement contribute to the filament current of the 3A5, an additional shunting resistor may be required between pins No. 1 and No. 7.
- ** Filament voltage applied across the two sections in parallel between pin No. 4 and pins No. 1 and No. 7 connected together. Grid voltage is referred to pins No. 1 and No. 7 tied together.
- o With no external shield
- Obtained by grid resistor (4000), cathode resistor (570), or fixed supply.
 - ▲ The center hole in sockets designed for this base provides for the possibility that this tube type may be manufactured with the exhaust-tube tip at the base end. For this reason, it is recommended that in equipment employing this tube type, no material be permitted to obstruct the socket hole.



3A5

$E_f = 1.4$ VOLTS D.C.



MARCH 14, 1942

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6376



4J50

MAGNETRON

FORCED-AIR COOLED

Fixed Frequency: 9375 ± 30 Mc

4J50

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathode:

Voltage $13.75 \pm 10\%$ ac or dc volts

Current 3.15 amp

Starting Current: The maximum instantaneous starting current must never exceed 12 amperes, even momentarily

Minimum Cathode Heating Time 4 minutes

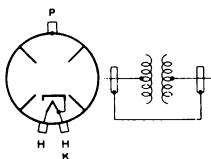
Frequency 9375 ± 30 Mc

Maximum Frequency Pulling at VSWR of 1.5/1 15 Mc

Maximum Frequency Change with
Anode Temperature Change 0.25 Mc/°C**Mechanical:**

Dimensions and

Terminal Connections:

See *Dimensional Outline*

H - Heater

K - Cathode

P - Anode

Connector (For heater terminal

and heater-cathode terminal) . . . Ucinite* No. 115364
with built-in capacitor, or equivalent

Mounting Position Any

Air Flow:

To Fins -- An air stream should be directed along the cooling fins toward the body of the tube. The stream may be obtained from a rectangular nozzle about 3-1/4" by 3/4" located so that the plane through the 3-1/4" side is parallel with the plane of a cooling fin and so that the nozzle is centered on the body of the tube. Adequate flow should be provided so that the temperature of the anode block does not exceed 150°C.

To Heater-Cathode Terminal -- Adequate flow should be provided to maintain the temperature of the heater-cathode terminal below 165°C.

Weight (Approx.) 9-1/2 lbs

PULSED OSCILLATOR SERVICE**Maximum and Minimum Ratings, Absolute Values:***For Duty Cycle of 0.001 max.*

PEAK ANODE VOLTAGE	21 max.	23 max.	kv
PEAK ANODE CURRENT	18 max.	27.5 max.	amp
PEAK POWER INPUT*	380 max.	635 max.	kw
AVERAGE POWER INPUT	0.38 max.	0.635 max.	kw
PULSE DURATION	6.0 max.	1.2 max.	μsec

* ucinite Div. of United-Carr Fastener Corp., Newtonville 60, Mass.

• For atmospheric pressures greater than 60 centimeters of mercury. operation at pressures lower than 60 centimeters of mercury may result in arc-over with consequent damage to the tube.

JUNE 14, 1954

TUBE DIVISION

TENTATIVE DATA 1

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

4J50



4J50

MAGNETRON

OPERATION TIME IN ANY

100-MICROSECOND INTERVAL . .	6.0 max.	6.0 max.	μ sec
RATE OF RISE OF VOLT. PULSE .	{ 110 max. 70 min.	110 max.	kv/ μ sec
ANODE-BLOCK TEMPERATURE . . .		150 max.	kv/ μ sec
HEATER-CATHODE TERMINAL TEMPERATURE	165 max.	165 max.	$^{\circ}$ C

**Typical Operation^A with Load-Voltage Standing-Wave
Ratio Equal to or Less than 1.05**

With Duty Cycle of 0.001 0.001 0.001

Heater Voltage	See Operating Considerations		
Magnetic Field	Supplied by permanent magnet integral with tube		
Peak Anode Voltage	20	21.0	21.5 kv
Peak Anode Current	18	23.5	27.5 amp
Pulse Repetition Rate	200	333	1000 cps
Pulse Duration	1	3	5 μ sec
Maximum RF Bandwidth	1.0	1.0	3.0 Mc
Peak Power Output	140	185	240 kw

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	Min.	Max.	
Heater Current	1	3.0	3.75	amp
Peak Anode Voltage	-	20	23	kv
Peak Power Output	2	225	-	kw

Note 1: With 13.75 volts ac or dc on heater.

Note 2: With peak anode current = 27.5 amperes corresponding to a peak anode voltage in the order of 21500 volts, anode-block temperature (approx.) = 100 $^{\circ}$ C, pulse duration = 1 microsecond, and maximum load-voltage standing-wave ratio equal to or less than 1.05.

^A It is essential that the input circuit be designed so that if arcing occurs the energy per pulse delivered to the tube cannot greatly exceed the normal energy per pulse. To satisfy this requirement, it is recommended that pulsers of the discharging-network type be used.

OPERATING CONSIDERATIONS

Rated voltage (13.75 volts) should be applied to the heater for at least 4 minutes to allow the cathode to reach normal operating temperature. When the cathode has reached normal operating temperature, high-voltage pulses, negative with respect to the anode (ground), may be applied to the heater-cathode terminal. As soon as the 4J50 starts to oscillate, the heater voltage (E_f) must be reduced approximately in accordance with the following formula depending on the value of average power input (P_i) to the tube:

P_i up to 100 watts: $E_f = 13.75$ volts

P_i greater than 100 watts: $E_f = 14 (1 - 0.000895P_i)$ volts

JUNE 14, 1954

TUBE DIVISION

TENTATIVE DATA 1

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



4J50

4J50

MAGNETRON

This formula applies to the conditions involving the pulse durations and pulse repetition rates under Typical Operation. If the 4J50 is to be operated with pulse durations and repetition rates different from those shown, write for recommendations as to required reduction in heater voltage to *Commercial Engineering, RCA, Harrison, New Jersey*, giving complete details as to the proposed service. When the tube is oscillating, the cathode is subjected to considerable electron bombardment which raises the temperature of the cathode. The magnitude of such heating is a function of the total dissipation and must be compensated by reduction of the heater voltage in order to prevent overheating of the cathode. Failure to start the tube at rated heater voltage and to reduce the heater voltage as soon as oscillation starts may seriously affect tube life. The heater should be protected against input pulse power by a suitable capacitor connected in shunt with the heater leads as near the input stem as possible in order to limit high transient voltages from developing across the heater.

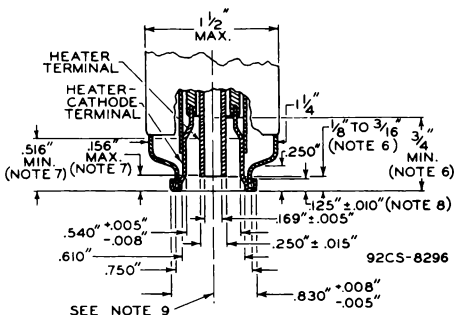


4J50

MAGNETRON

4J50

DETAIL A



Reference plane A is defined as the plane through a plane surface on which the mounting flange rests.

Reference plane B is defined as the plane which is perpendicular to plane A and plane C and passes through the exact center of mounting flange holes No.3 and No.4.

Reference plane C is defined as the plane which is perpendicular to plane A and passes through the exact centers of mounting flange holes No.2 and No.3.

NOTE 1: THE WAVEGUIDE OUTPUT FLANGE AND THE MOUNTING FLANGE ARE MADE SO THAT THEY MAY BE USED TO PROVIDE A HERMETIC SEAL AT SURFACE D AND SURFACE E.

NOTE 2: THE AXIS OF THE HEATER-CATHODE TERMINAL WILL BE WITHIN THE CONFINES OF A CYLINDER WHOSE RADIUS IS 3/64" AND WHOSE AXIS IS PERPENDICULAR TO REFERENCE PLANE A AND LOCATED AS DIMENSIONED FROM PLANES B AND C.

NOTE 3: ALL POINTS ON MOUNTING SURFACE D WILL BE WITHIN 0.005" OF MOUNTING PLANE A.

NOTE 4: WHEN RESTING ON A PLANE SURFACE, SURFACE E OF THE WAVEGUIDE OUTPUT FLANGE HAS A FLATNESS SUCH THAT A 0.005" THICKNESS GAUGE 1/8" WIDE WILL NOT ENTER BETWEEN SURFACE E AND THE PLANE SURFACE.

NOTE 5: NO PART OF THE TUBE SUPPORT FASTENED TO THE MOUNTING FLANGE SHOULD EXTEND BEYOND THE SURFACE OF A CYLINDER WHOSE RADIUS IS 3/4" AND WHOSE AXIS IS PERPENDICULAR TO REFERENCE PLANE A AND LOCATED AS DIMENSIONED FROM PLANES B AND C.

NOTE 6: THESE DIMENSIONS DEFINE EXTREMITIES OF THE 0.169" INTERNAL DIAMETER OF THE CYLINDRICAL HEATER TERMINAL.

4J50



4J50

MAGNETRON

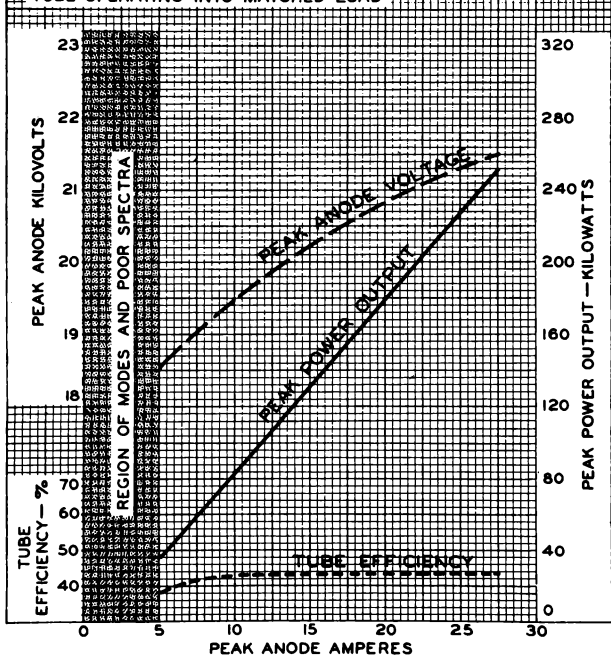
NOTE 7: THESE DIMENSIONS DEFINE EXTREMITIES OF THE 0.540" INTERNAL DIAMETER OF THE CYLINDRICAL HEATER-CATHODE TERMINAL.

NOTE 8: NO PART OF THE CONNECTOR DEVICE FOR THE HEATER AND HEATER-CATHODE TERMINALS SHOULD BEAR AGAINST THE UNDERSIDE OF THIS LIP.

NOTE 9: THE HEATER TERMINAL AND THE HEATER-CATHODE TERMINAL ARE CONCENTRIC WITHIN 0.010".

PERFORMANCE CHART

OPERATING FREQUENCY: 9375 ± 30 Mc
 PULSE DURATION: 1 MICROSECOND
 PULSE REPETITION RATE: 1000 PPS
 PULLING FIGURE: 9.5 Mc
 TUBE OPERATING INTO MATCHED LOAD



92CM-8260

JUNE 14, 1954

TUBE DIVISION

CE-8297B-8260

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



4B26/2000

4B26

HALF-WAVE GAS RECTIFIER

HOT-CATHODE TYPE

Filament	Thoriated Tungsten	
Voltage	2.2	a-c volts
Current	18	amp.
Overall Length		6-5/8" ± 3/8" ←
Maximum Diameter		3-1/4" ←
Bulb		GT-25
End Terminal		See Outline Drawing
Base		Mogul Screw
Mounting Position		Any

*Maximum Ratings Are Absolute Values*RECTIFIER

Peak Inverse Anode Voltage:			
In Single-Phase, Half-Wave Circuit	375 max.	volts	←
In Single-Phase, Full-Wave Circuit	250 max.	volts	
In Polyphase Circuit	250 max.	volts	
Peak Anode Current	36 max.	amp.	←
D-C Output Current	6 max.	amp.	

Characteristics:

Instantaneous Starting Anode Voltage*	13 approx. volts
Tube Voltage Drop	8 approx. volts

* To insure starting throughout tube life, an anode-supply voltage of not less than 20 volts (rms) is recommended. The actual design value above this minimum will depend on the nature of the load on the tube in any particular application.

If the output of the 4B26/2000 is filtered,
the filter should be of the choke-input type.

Suitable circuits for use with the 4B26/2000
are the same as those shown for
Type 872-A/872.

← Indicates a change.

AUG. 15, 1944

RCA VICTOR DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

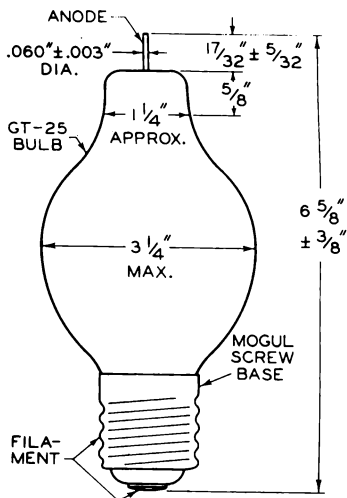
DATA

4B26



4B26

HALF-WAVE GAS-RECTIFIER



92CM-6147RI

← Indicates a change.

AUG. 15, 1944

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA



4J52*

MAGNETRON

FORCED-AIR COOLED

Fixed Frequency: 9375 $\pm$ 30 Mc

4J52

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage 12.6 $\pm$ 10% ac or dc volts

Current 2.1 amp

Starting Current: The maximum instantaneous starting current must never exceed 8 amperes, even momentarily

Minimum Cathode Heating Time 4 minutes

Frequency 9375 $\pm$ 30 Mc

Maximum Frequency Pulling 15 Mc

Maximum Frequency Change with Anode

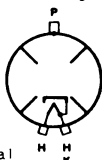
Temperature Change 0.25 Mc/°C

Mechanical:

Dimensions and

Terminal Connections:

See Outline Drawing



H - Heater
K - Cathode
P - Anode

Connector (For heater terminal

and heater-cathode terminal) . . . Ucinite* No. 115316 or No. 115402 with built-in capacitor, or equivalent.

Mounting Position Any

Dimensions See Outline Drawing

Air Flow to Fins:

An air stream should be directed along the cooling fins toward the body of the tube. The stream may be obtained from a rectangular nozzle 3-1/4" by 3/4" located so that the plane through the 3-1/4" side is parallel with the plane of a cooling fin and so that the nozzle is centered on the body of the tube. Adequate flow should be provided so that the temperature of the anode block does not exceed 150°C.

Weight (Approx.) 5-1/2 lbs

PULSED OSCILLATOR SERVICE

Maximum Ratings, Absolute Values:

For Duty Cycle of 0.002 max.

PEAK ANODE VOLTAGE 16 max. 16 max. kv

PEAK ANODE CURRENT 20 max. 30 max. amp

PEAK POWER INPUT 300 max. 450 max. kw

AVERAGE POWER INPUT 0.3 max. 0.45 max. kw

PULSE DURATION 5.0 max. 1.2 max. μ sec

OPERATION TIME IN ANY 100-

MICROSECOND INTERVAL 6.0 max. 6.0 max. μ sec

ANODE-BLOCK TEMPERATURE 150 max. 150 max. °C

* Data shown for this type are in accord with JAN-1A Specification 4J52, 30 January 1952.

* ucinite Div. of United-Carr Fastener Corp., Newtonville 60, Mass.

• For atmospheric pressures greater than 60 centimeters of mercury. operation at pressures lower than 60 centimeters of mercury may result in arcover with consequent damage to the tube.

OCT. 1, 1953

TUBE DEPARTMENT

TENTATIVE DATA 1

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

4J52



4J52

MAGNETRON

**Typical Operation with Load-Voltage Standing-Wave
Ratio Equal to or Less Than 1.05^A:**

With Duty Cycle of	0.0006	0.001	0.001	
Heater Voltage	See Operating Considerations			
Magnetic Field	Supplied by permanent magnet integral with tube			
Peak Anode Voltage . . .	15	15	15	kv
Peak Anode Current . . .	15	15	15	amp
Pulse Repetition Rate . .	2000	1000	200	cps
Pulse Duration	0.3	1	5	μsec
Maximum RF Bandwidth . .	9	3	1	Mc
Maximum Rate of Rise of Voltage Pulse	130	130	100	kv/μsec
Peak Power Output	80	80	80	kw

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	Min.	Max.	
Heater Current	1	1.8	2.4	amp
Peak Anode Voltage	—	14	16	kv
Peak Power Output	2	65	—	kw

Note 1: With 12.6 volts ac or dc on heater.

Note 2: With peak anode current = 15 amperes corresponding to a peak anode voltage in the order of 15000 volts, anode-block temperature (approx.) = 100°C, and maximum load-voltage standing-wave ratio equal to or less than 1.05.

^A It is essential that the input circuit be designed so that if arcing occurs the energy per pulse delivered to the tube cannot greatly exceed the normal energy per pulse. To satisfy this requirement, it is recommended that pulsers of the discharging-network type be used.

OPERATING CONSIDERATIONS

Rated voltage (12.6 volts) should be applied to the heater for at least 4 minutes to allow the cathode to reach normal operating temperature. When the cathode has reached normal operating temperature, high-voltage pulses, negative with respect to the anode (ground), may be applied to the heater-cathode terminal. As soon as the 4J52 starts to oscillate, the heater voltage (E_f) must be reduced approximately in accordance with the following formula depending on the value of average power input (P_i) to the tube:

P_i up to 130 watts: $E_f = 12.6 \text{ volts} - 0.04P_i$

P_i from 130 to 450 watts: $E_f = 10.5 \text{ volts} - 0.02P_i$

where P_i is the average power input to the tube. This formula applies to conditions for pulse durations of 1 microsecond or less and for pulse repetition rates of 1000 pps or more. Normal pulse shape and regulation are assumed; the effect of power supply regulation is not considered. For longer pulse durations and lower pulse

OCT. 1, 1953

TUBE DEPARTMENT

TENTATIVE DATA 1

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



4J52

MAGNETRON

4J52

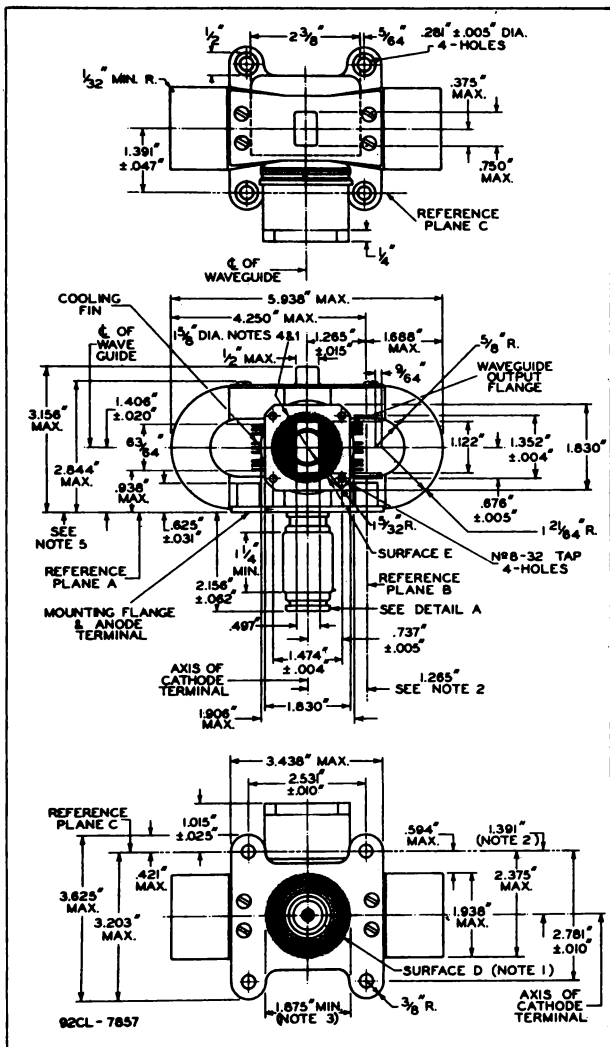
repetition rates, the heater voltage must be increased. The increase in heater voltage is often between 1 and 2 volts depending on the particular application. Rates of rise of the voltage pulse faster than those indicated under Typical Operation are not recommended because they tend to cause unstable operation. A very poor regulation characteristic during the first part of the pulse may indicate, if unstable operation occurs, that an increase in heater voltage is desirable. Increasing the heater voltage under these conditions may, however, decrease the life of the tube. When the tube is oscillating, the cathode is subjected to considerable electron bombardment which raises the temperature of the cathode. The magnitude of the heating is a function of the total dissipation and must be compensated by reduction of the heater voltage in order to prevent overheating of the cathode. Failure to start the tube at rated heater voltage and to reduce the heater voltage as soon as oscillation starts may seriously affect tube life. The heater should be protected against input pulse power by placing a suitable capacitor in shunt with the heater leads as near the input stem as possible in order to limit high transient currents from developing across the heater.

4J52



4J52

MAGNETRON



OCT. 1, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-7857A



MAGNETRON

HEATER TERMINAL

HEATER-CATHODE TERMINAL

1.125" MAX.

1/8" TO 3/16"

3/4" MIN.

5/16" MIN.

.156" MAX.

1/8"

(NOTE 6)

(NOTE 7)

(NOTE 8)

.125" $\pm .010$ "

.169" $\pm .005$ "

.250" $\pm .015$ "

.540" $^{+.005}_{-.008}$

.610"

.750"

.830" $^{+.008}_{-.005}$ "

SEE NOTE 9

92CS-7858

NOTE 3: WHEN RESTING ON A PLANE SURFACE (REFERENCE PLANE A), THE SURFACE D HAS A FLATNESS SUCH THAT A 0.010" THICKNESS GAUGE 1/8" WIDE WILL NOT ENTER BETWEEN SURFACE D AND THE PLANE SURFACE. ALSO, THE MOUNTING-FLANGE SURFACE OUTSIDE OF SURFACE D WILL BE WITHIN 0.010" OF THE PLANE SURFACE.

4J52



4J52

MAGNETRON

NOTE 4: WHEN RESTING ON A PLANE SURFACE, SURFACE E OF THE WAVEGUIDE OUTPUT FLANGE HAS A FLATNESS SUCH THAT A 0.005" THICKNESS GAUGE 1/8" WIDE WILL NOT ENTER BETWEEN SURFACE E AND THE PLANE SURFACE.

NOTE 5: NO PART OF THE TUBE SUPPORT FASTENED TO THE MOUNTING FLANGE SHOULD EXTEND BEYOND THE SURFACE OF A CYLINDER WHOSE RADIUS IS 5/8" AND WHOSE AXIS IS PERPENDICULAR TO REFERENCE PLANE A AND LOCATED AT THE TRUE CENTER OF THE MOUNTING FLANGE.

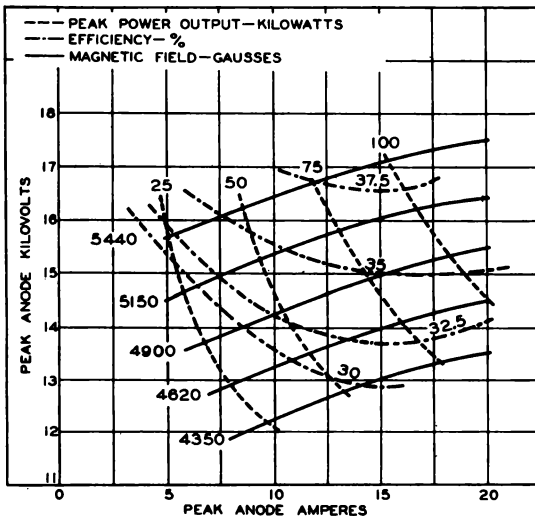
NOTE 6: THESE DIMENSIONS DEFINE EXTREMITIES OF THE 0.169" INTERNAL DIAMETER OF THE CYLINDRICAL HEATER TERMINAL.

NOTE 7: THESE DIMENSIONS DEFINE EXTREMITIES OF THE 0.540" INTERNAL DIAMETER OF THE CYLINDRICAL HEATER-CATHODE TERMINAL.

NOTE 8: NO PART OF THE CONNECTOR DEVICE FOR THE HEATER AND HEATER-CATHODE TERMINALS SHOULD BEAR AGAINST THE UNDERSIDE OF THIS LIP.

NOTE 9: THE HEATER TERMINAL AND THE HEATER-CATHODE TERMINAL ARE CONCENTRIC WITHIN 0.010".

PERFORMANCE CHART



92CM-7843

OCT. 1, 1953

TUBE DEPARTMENT
 RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-7857C-7843



5R4-GY

5R4-GY FULL-WAVE VACUUM RECTIFIER

GENERAL DATA

Electrical:

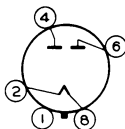
Filament, Coated:*

Voltage. 5 ac or dc volts
Current. 2 amp

Mechanical:

Mounting Position. Vertical, or Horizontal with pins
1 and 4 in vertical plane
Maximum Overall Length 5-5/16"
Maximum Seated Length. 4-3/4"
Maximum Diameter 2-1/16"
Bulb ST-16
Base Medium-Shell Octal 5-Pin, Micanol
Basing Designation for BOTTOM VIEW G-5T

Pin 1—No Connection
Pin 2—Filament
Pin 4—Plate No.2



Pin 6—Plate No.1
Pin 8—Filament

FULL-WAVE RECTIFIER

Maximum Ratings, Design-Center Values:

	For Altitudes up to 40000 ft.		For Altitudes up to 20000 ft.
PEAK INVERSE PLATE VOLT. (No Load)	2100 max.	2400 max.	2800 max. volts
PEAK PLATE CURRENT PER PLATE . . .	650 max.	650 max.	650 max. ma
DC OUTPUT CURRENT:			
With capacitor input to filter	250 max.	175 max.	150 max. ma
With choke input to filter . . .	250 max.	250 max. ^o	175 max. [•] ma

Typical Operation with Capacitor-Input Filter:

	For Altitudes up to 40000 ft.		For Altitudes up to 20000 ft.
AC Plate-to-Plate Supply Voltage (RMS):			
Full Load . . .	1400 . .	1500 . .	1800 . . volts
No Load. . . .	1500 . .	1700 . .	2000 . . volts
Filter Input			
Capacitor. . .	4 . .	4 . .	4 . . μf

* See curve for conditions necessitating delay in application of plate voltage until filament has reached operating temperature.

o, •: See next page.

← Indicates a change.

SEPT. 30, 1948

TUBE DEPARTMENT

DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5R4-GY



5R4-GY FULL-WAVE VACUUM RECTIFIER

	<u>For Altitudes up to 40000 ft.</u>		<u>For Altitudes up to 20000 ft.</u>	
Total Effect. Plate-Supply Impedance per Plate ^Δ . . .	125	500	575	ohms
DC Output Current.	250	150	150	ma
DC Output Volt. at Input to Filter:				
At Half Load . .	790*	900*	1060*	volts
At Full Load . .	700*	810*	950*	volts
Voltage Regulation, Half-Load to Full-Load Current . .	90*	90*	110*	volts

→ Typical Operation with Choke-Input Filter:

	<u>For Altitudes up to 40000 ft.</u>	<u>For Altitudes up to 20000 ft.</u>
AC Plate-to-Plate Supply Voltage (RMS):		
Full Load.	1500	1900 . . volts
No Load.	1700	2000 . . volts
Filter Input Choke	5	10 . . henries
DC Output Current.	250	175 . . ma
DC Output Voltage at Input to Filter:		
At Half Load	590*	810* . . volts
At Full Load	550*	750* . . volts
Voltage Regulation, Half-Load to Full-Load Current	40*	60* . . volts

○ For choke not less than 5 henries.

● For choke not less than 10 henries.

▲ Indicated values for conditions shown will limit peak plate current to max. rated value. When a filter-input capacitor larger than 4 μf is used, it may be necessary to use more plate-supply impedance than the value shown to limit the peak plate current to the rated value.

* Values are approximate.

→ Indicates a change.

SEPT. 30, 1948

TUBE DEPARTMENT

DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

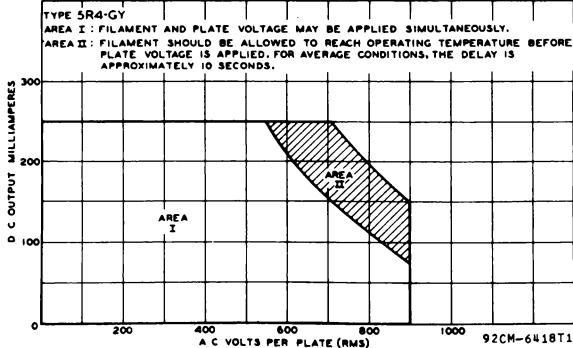


5R4-GY

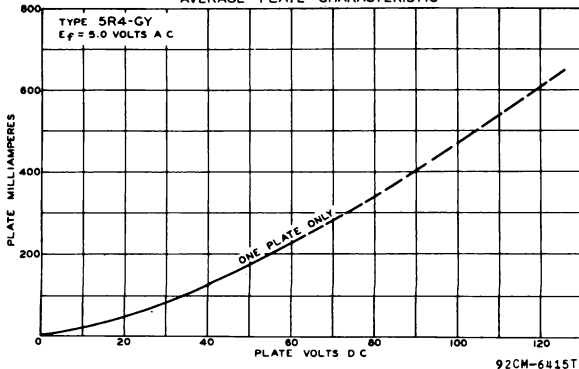
FULL-WAVE VACUUM RECTIFIER

5R4-GY

OPERATION CHARACTERISTICS
WITH CAPACITOR INPUT TO FILTER



AVERAGE PLATE CHARACTERISTIC



SEPT. 30, 1948

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

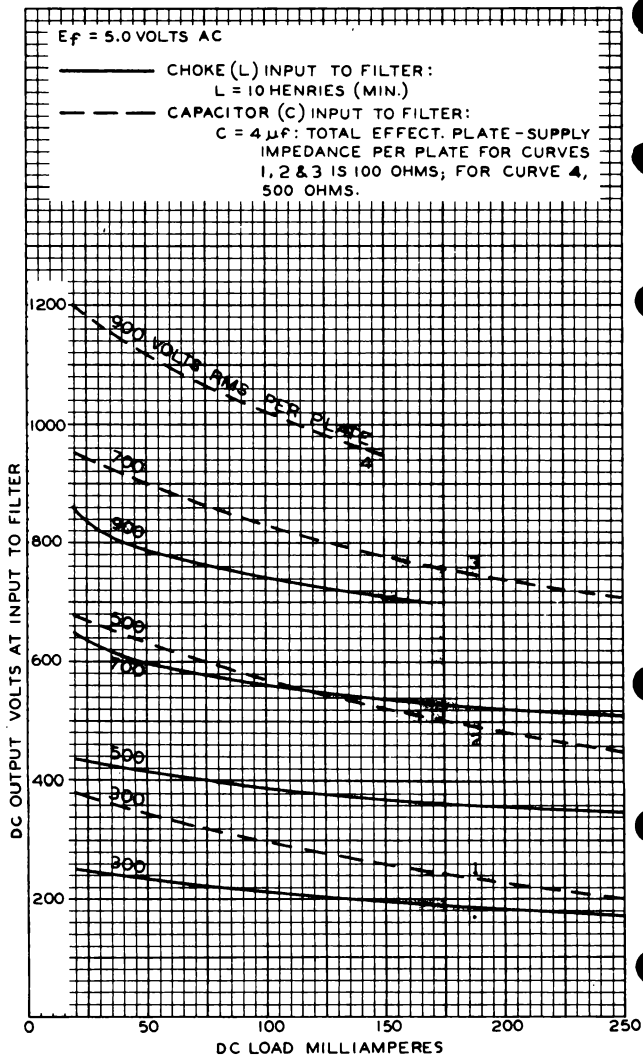
CE-6418T1-6415T

5R4-GY



5R4-GY

OPERATION CHARACTERISTICS



SEPT. 30, 1948

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6416R2



6AS6

6AS6

SHARP-CUTOFF PENTODE

MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage. 6.3 ac or dc volts

Current. 0.175 amp

Direct Interelectrode Capacitances:

	Without Ex- ternal Shield	With External Shield No. 316	
Grid No.1 to Plate . .	0.025 max.	0.02 max.	μf
Input.	3.9	4.0	μf
Output	2.2	3.0	μf
Grid No.1 to			
Grid No.3. . . .	0.15 max.	0.15 max.	μf
Grid No.3 to Plate . .	0.7 max.	0.7 max.	μf
Grid No.3 to All			
Other Electrodes . .	3.3	3.4	μf

Mechanical:

Mounting Position. Any

Maximum Overall Length 1-3/4"

Maximum Seated Length. 1-1/2"

Length, Base Seat to Bulb Top (Excluding tip). . 1-1/8" $\pm$ 3/32"

Maximum Diameter 3/4"

Bulb T-5-1/2

Base Small-Button Miniature 7-Pin

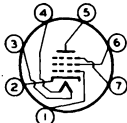
Basing Designation for BOTTOM VIEW 7CM1

Pin 1-Grid No.1

Pin 2-Cathode

Pin 3-Heater

Pin 4-Heater



Pin 5-Plate

Pin 6-Grid No.2

Pin 7-Grid No.3

AMPLIFIER - Class A₁

Maximum Ratings, Design-Center Values:

PLATE VOLTAGE. 180 max. volts

GRID-No.3 VOLTAGE. 27 max. volts

GRID-No.2 VOLTAGE. 140 max. volts

CATHODE CURRENT. 18 max. ma

PLATE DISSIPATION. 1.7 max. watts

GRID-No.2 INPUT. 0.75 max. watt

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode. . 90 max. volts

Heater positive with respect to cathode. . 90 max. volts

BULB TEMPERATURE (At hottest point
on bulb surface). 120 max. °C

Characteristics:

Plate Voltage. 120 120 volts

FEB. 1, 1950

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA

6AS6



6AS6

SHARP-CUTOFF PENTODE

Grid-No.3 Voltage.	-3	0	volts
Grid-No.2 Voltage.	120	120	volts
Grid-No.1 Voltage.	-2	-2	volts
Plate Resistance (Approx.)	-	0.15	megohm
Transconductance, Grid No.1 to Plate.	1850	3200	μ nhos
Transconductance, Grid No.3 to Plate.	810	470	μ nhos
Plate Current.	3.6	5.2	ma
Max. Plate Current for Grid-No.1 Volts = -10. . . .	-	100	μ amp
Max. Plate Current for Grid-No.3 Volts = -15. . . .	-	20	μ amp
Grid-No.2 Current.	4.8	3.5	ma

FEB. 1, 1950

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

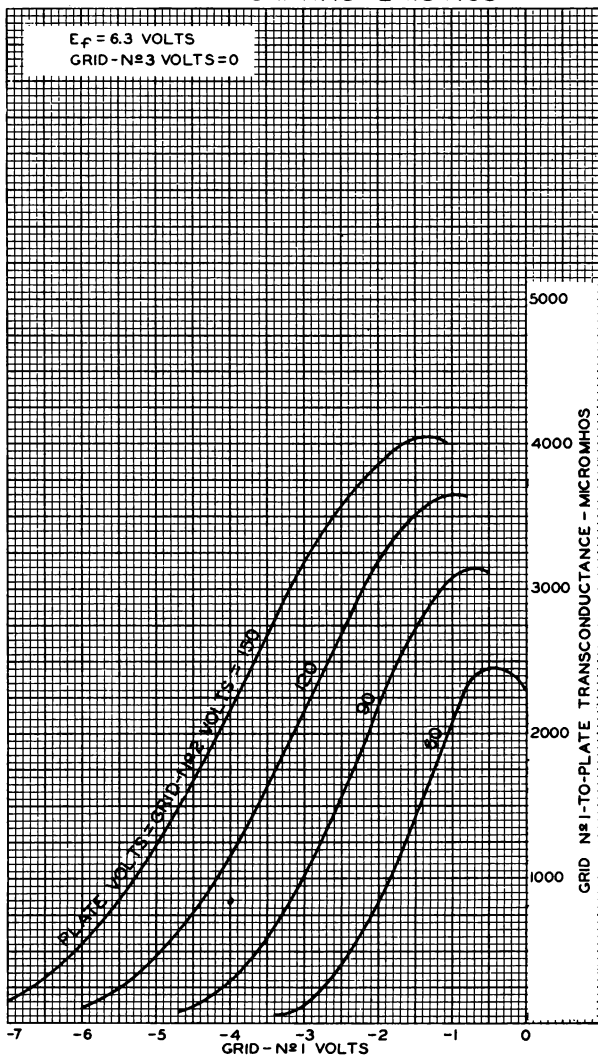
TENTATIVE DATA



6AS6

6AS6

AVERAGE CHARACTERISTICS



NOV. 4, 1949

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7401

6AS6

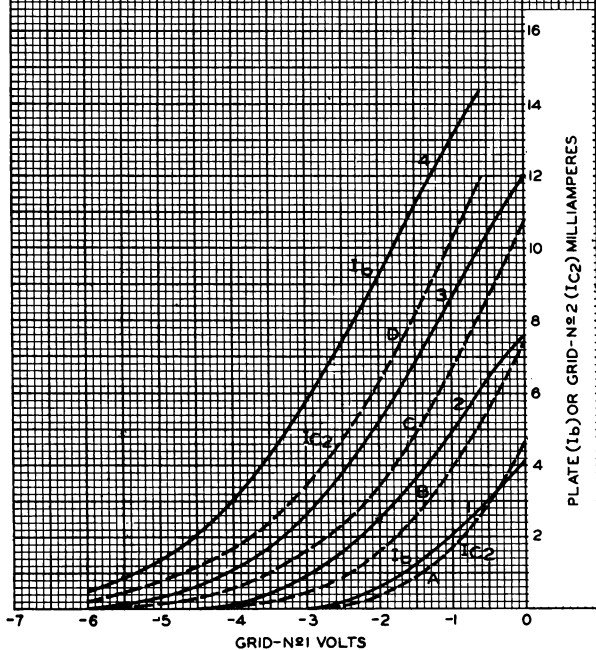


6AS6

AVERAGE CHARACTERISTICS

$E_f = 6.3$ VOLTS
GRID-Nº3 VOLTS = 0

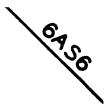
CURVES		PLATE AND GRID-Nº2 VOLTS
I_b —	I_{c2} - -	
1	A	60
2	B	90
3	C	120
4	D	150



NOV. 7, 1949

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7402

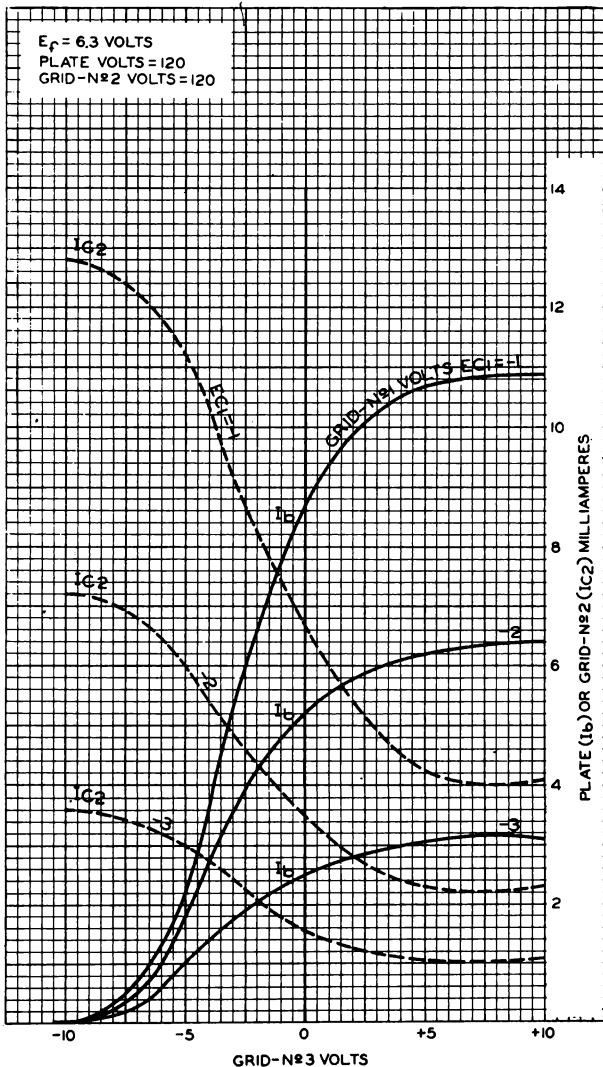


6AS6



6AS6

AVERAGE CHARACTERISTICS



NOV. 9, 1949

 TUBE DEPARTMENT
 RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

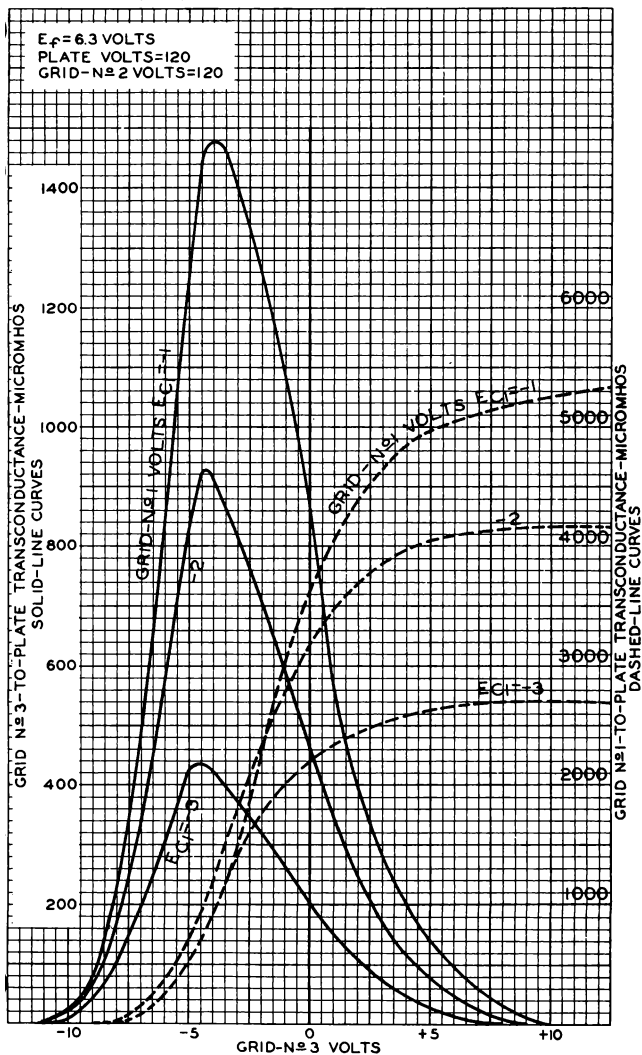
92CM-7403



6AS6

6AS6

AVERAGE CHARACTERISTICS



NOV.10,1949

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7404



6AS7-G

6AS7-G

LOW-MU TWIN POWER TRIODE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:

Voltage. 6.3 ac or dc volts

Current. 2.5 amp

Direct Interelectrode Capacitances (Approx., each unit):^oGrid to plate. 10.5 μf Grid to heater and cathode 6.8 μf Plate to heater and cathode 2.3 μf Heater to cathode. 11.0 μf Grid of unit No.1 to grid of unit No.2 0.70 μf Plate of unit No.1 to
plate of unit No.2. 1.65 μf Characteristics, Class A₁ Amplifier (Each unit):

Plate-Supply Voltage 135 volts

Cathode-Bias Resistor 250 ohms

Amplification Factor 2

Plate Resistance (Approx.) 280 ohms

Transconductance 7000 μmhos

Plate Current. 125 ma

Mechanical:

Mounting Position. Any

Maximum Overall Length 5-5/16"

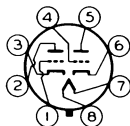
Maximum Seated Length. 4-3/4"

Maximum Diameter 2-1/16"

Bulb ST-16

Base Medium-Shell Octal 8-Pin (JETEC No.88-11)

Basing Designation for BOTTOM VIEW 8BD

Pin 1 - Grid of
Unit No.2Pin 2 - Plate of
Unit No.2Pin 3 - Cathode of
Unit No.2Pin 4 - Grid of
Unit No.1Pin 5 - Plate of
Unit No.1Pin 6 - Cathode of
Unit No.1

Pin 7 - Heater

Pin 8 - Heater

DC AMPLIFIER

Values are for Each Unit

Maximum Ratings, Design-Center Values:

PLATE VOLTAGE. 250 max. volts

PLATE CURRENT. 125 max. ma

PLATE DISSIPATION. 13 max. watts

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode. 300 max. volts

Heater positive with respect to cathode. 300 max. volts

^o Without external shield.[■] Operation with fixed bias is not recommended.

← Indicates a change.

MAY 1, 1955

TUBE DIVISION

DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6AS7-G



6AS7-G

LOW-MU TWIN POWER TRIODE

Maximum Circuit Values (For maximum rated conditions):

Grid-Circuit Resistance:

For cathode-bias operation	1.0 max. megohm
For fixed-bias operation	Not recommended

BOOSTER SCANNING SERVICE

Values are for Each Unit

Maximum Ratings, Design-Center Values:

For operation in a 525-line, 30-frame system[□]

PEAK NEGATIVE-PULSE PLATE VOLTAGE [●]	1700 max.	volts
DC PLATE CURRENT	125 max.	ma
PLATE DISSIPATION.	13 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode .	300 max.	volts
Heater positive with respect to cathode .	300 max.	volts

Maximum Circuit Values (For maximum rated conditions):

Grid-Circuit Resistance:

For cathode-bias operation	1.0 max. megohm
For fixed-bias operation	Not recommended

□ As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations", Federal Communications Commission.

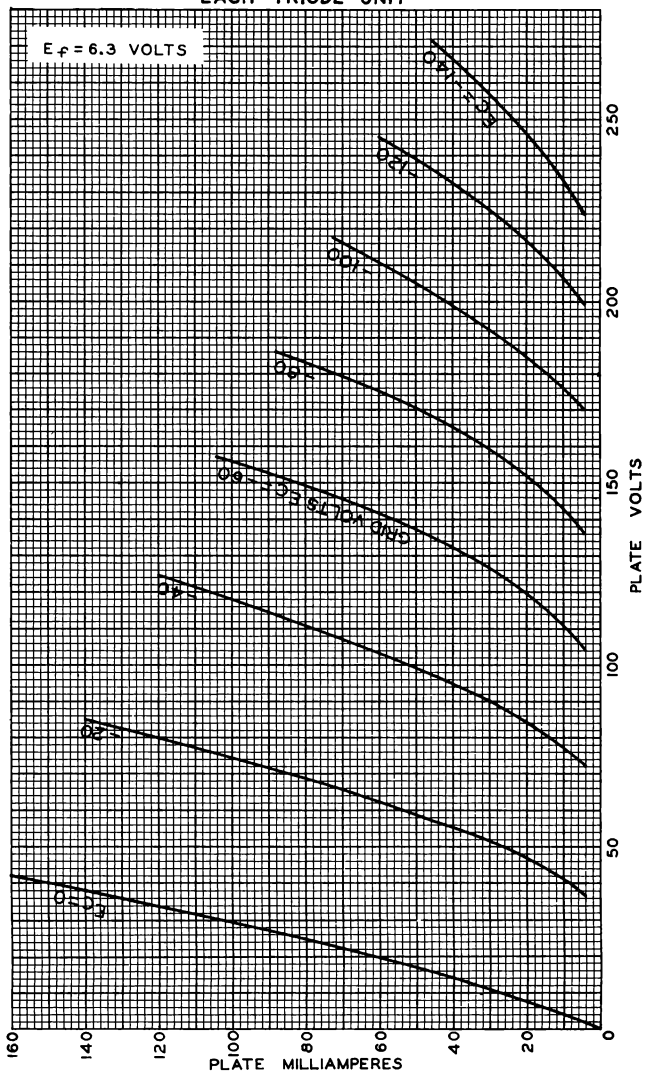
● The duration of the voltage pulse must not exceed 15 per cent of one horizontal scanning cycle. In a 525-line, 30-frame system, 15 per cent of one horizontal scanning cycle is 10 microseconds.



6AS7-G

AVERAGE PLATE CHARACTERISTICS
EACH TRIODE UNIT

6AS7-G



NOV. 6, 1945

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6618

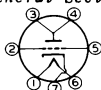


6F4

6F4 OSCILLATOR TRIODE ACORN TYPE

For use at frequencies up to 1200 Mc approx.

Heater	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.225	amp.
Direct Interelectrode Capacitances:°		
Grid to Plate	1.9	μf
Grid to Cathode & Heater	2.0	μf
Plate to Cathode & Heater	0.6	μf
Overall Length	1-7/32" ± 5/32"	
Overall Diameter (including radial pins)	1-3/32" ± 1/16"	
Bulb }	{ See Outline in General Section }	
Base }		
Pin 1-Heater	{ Small Radial 7-Pin	
Pin 2-Grid	Pin 5-Grid	
Pin 3-Plate	Pin 6-Heater	
Pin 4-Plate	Pin 7-Cathode	
Mounting Position	Any	



BOTTOM VIEW (7BR)

Maximum Ratings Are Design-Center Values

A-F AMPLIFIER

Plate Voltage	150 max. volts
Plate Supply Voltage	300 max. volts
Plate Current	15 max. ma.
Plate Dissipation	2 max. watts
D-C Heater-Cathode Potential	80 max. volts

Characteristics - Class A₁ Amplifier:

Plate Voltage	80	volts
Cathode-Bias Resistor [□]	150	ohms
Amplification Factor	17	
Plate Resistance	2900	ohms
Transconductance	5800	μmhos
Plate Current	13	ma.

R-F POWER AMPLIFIER & OSCILLATOR - Class C Telegraphy

D-C Plate Voltage	150 max. volts
D-C Plate Supply Voltage	300 max. volts
D-C Grid Voltage	-50 max. volts
D-C Plate Current	20 max. ma.
D-C Grid Current	8 max. ma.
Plate Dissipation	2 max. watts
D-C Heater-Cathode Potential	80 max. volts

Typical Operation at Moderate Frequencies:•

D-C Plate Voltage	150	volts
D-C Grid Voltage♦	{	-15 volts
		550 ohms
		2000 ohms
D-C Plate Current		20 ma.
D-C Grid Current (Approx.) [°]		7.5 ma.
Driving Power (Approx.) [°]		0.2 watt
Power Output (Approx.)		1.8 watts

□, ◻, •, ♦, °: See next page.

AUG. 15, 1944

RCA VICTOR DIVISION

TENTATIVE DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6F4



6F4

OSCILLATOR TRIODE

(continued from preceding page)

- With no external shield.
- Fixed-bias operation is not recommended. Under maximum rated conditions, the d-c resistance in the grid circuit should not exceed 0.5 megohm.
- Approximately 45 milliwatts can be obtained when the 6F4 is used at 1200 megacycles as an oscillator with 100 volts on plate, maximum rated plate dissipation, and grid resistor of 2000 ohms.
- ◆ Obtained from fixed supply, or by cathode resistor (550), grid resistor (2000), or partial self-bias methods.
- Subject to wide variations as explained under TUBE RATINGS in General Section.

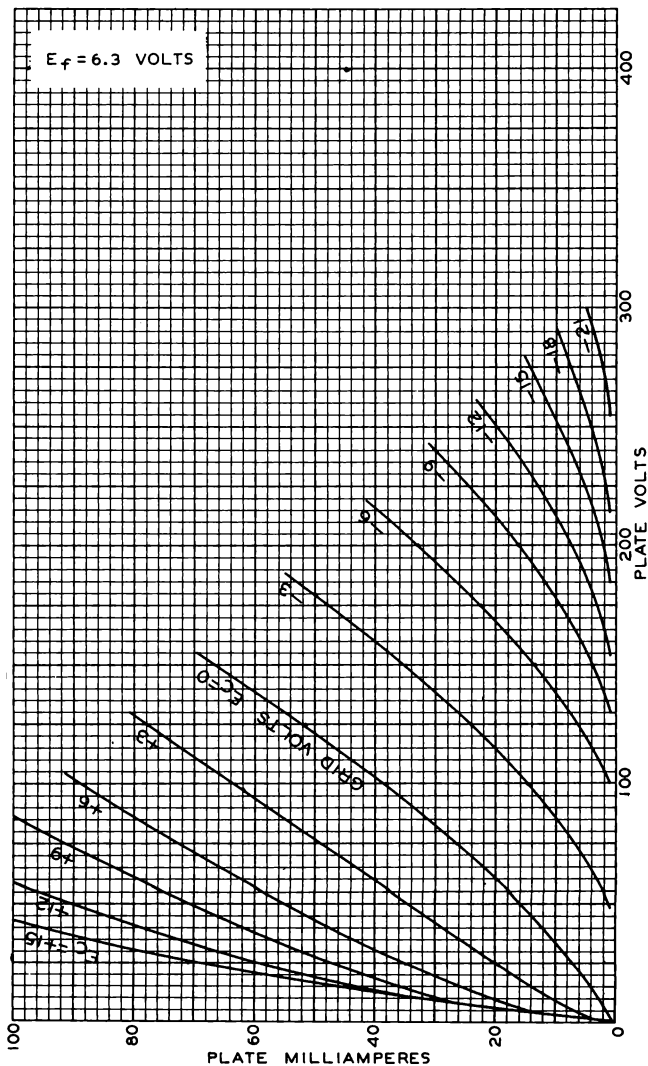
The socket for the 6F4 should be electrically and mechanically compact, and be made with an insulating material having a loss factor not exceeding 0.035 to permit operation of the 6F4 at high frequencies. For most satisfactory performance of the 6F4, it is essential that the inductance of connections between tube and circuit be kept as low as possible.



6F4

6F4

AVERAGE PLATE CHARACTERISTICS



JULY 12, 1944

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

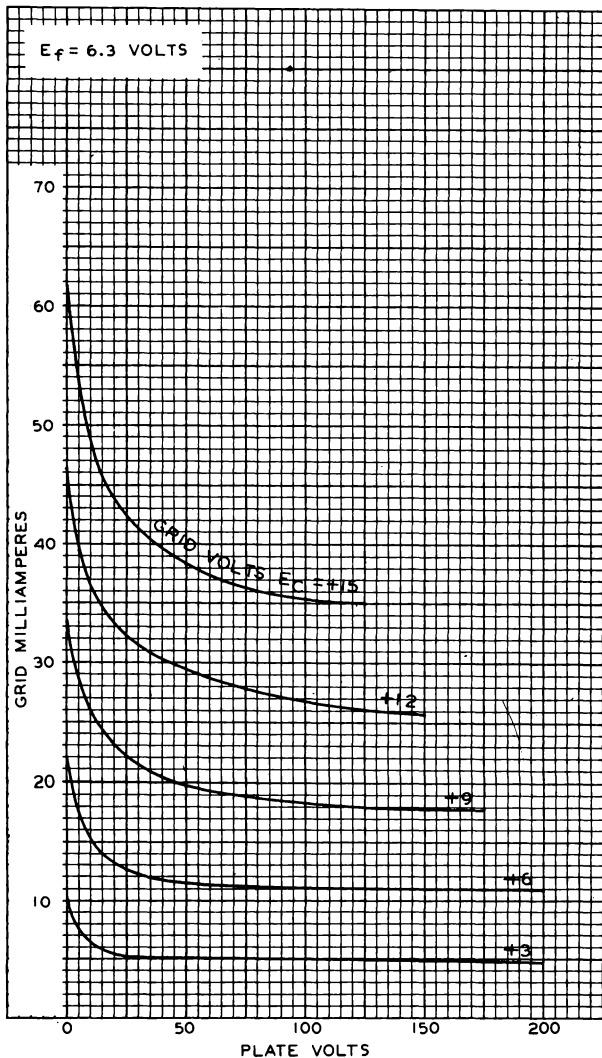
92CM-6567

6F4



6F4

TYPICAL CHARACTERISTICS



JULY 13, 1944

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6470



6J4

U-H-F AMPLIFIER TRIODE

GROUNDED-GRID, MINIATURE TYPE

For use at frequencies up to 500 Mc. approx.

Heater	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.4	amp.
Direct Interelectrode Capacitances (Approx.): ^o		
Plate to Cathode & Heater	0.24 max.	μf
Grid to Cathode & Heater	5.5	μf
Grid to Plate	4	μf
Heater to Cathode	2.8	μf
Maximum Overall Length		2-1/8"
Maximum Seated Height		1-7/8"
Length from Base Seat		
to Bulb Top (excluding tip)		1-1/2" $\pm$ 3/32"
Maximum Diameter		3/4"
Bulb		T-5-1/2"
Base [▲]	Miniature Button 7-Pin	
Pin 1-Grid	Pin 5-Grid	
Pin 2-Cathode	Pin 6-Grid	
Pin 3-Heater	Pin 7-Plate	
Pin 4-Heater		
RCA Socket		Stock No. 9914
Mounting Position		Any



BOTTOM VIEW (7BQ)

*Maximum Ratings Are Design-Center Values*GROUNDED-GRID AMPLIFIER

Plate Voltage		150 max. volts
Plate Dissipation		2.25 max. watts
Plate Current		20 max. ma.
D-C Heater-Cathode Potential		90 max. volts
<i>Typical Operation and Characteristics - Class A₁ Amplifier:</i>		
Plate Voltage	100	150 volts
Cathode-Bias Resistor*		
(Suitably by-passed)	100	100 ohms
Amplification Factor	55	55
Plate Resistance	5000	4500 ohms
Transconductance	11000	12000 μmhos
Plate Current	10	15 ma.

^o With close-fitting shield connected to grid.

* The 6J4 should always be used with a cathode-bias resistor suitably by-passed. The d-c resistance in the grid circuit under maximum rated conditions should be limited to 0.25 megohm.

[▲] The center hole in sockets designed for this base provides for the possibility that this tube type may be manufactured with the exhaust tube tip at the base end. For this reason, it is recommended that in equipment employing this tube type, no material be permitted to obstruct the socket hole.

APRIL 1, 1944

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA

6J4



6J4

U-H-F AMPLIFIER TRIODE

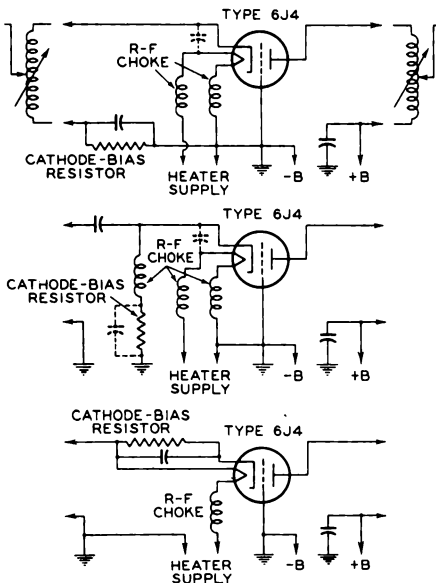
(continued from preceding page)

NOTE:

For grounded-grid operation, all three grid terminals should be grounded to minimize the effects of grid-lead inductance on u-h-f performance.

In arranging the circuit for the 6J4 used as a grounded-grid r-f amplifier or mixer, it is preferable to have the heater operate at the same r-f potential as the cathode, so that the cathode-heater capacitance will not be added across the input-circuit capacitance. Placing r-f chokes in series with the heater leads is suggested as a suitable method of operating heater and cathode at the same r-f potential.

TYPICAL GROUNDED-GRID CIRCUITS Having Heater at R-F Cathode Potential



92CM-6550

The license extended to the purchaser of tubes appears in the License Notice accompanying them. Information contained herein is furnished without assuming any obligations.

APRIL 1, 1944

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

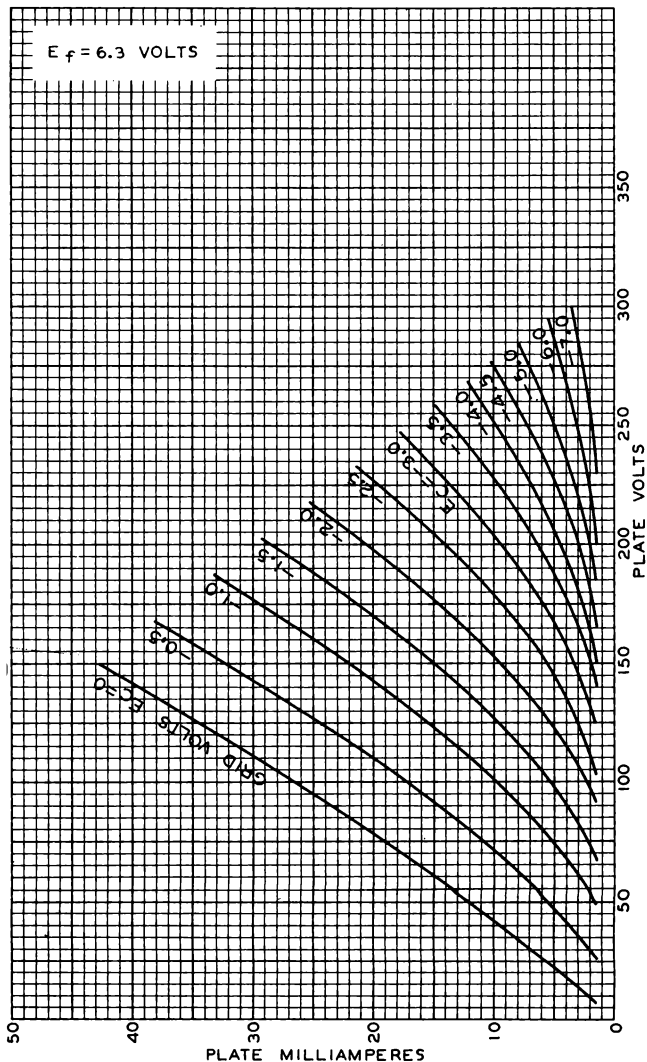
TENTATIVE DATA



6J4

6J4

AVERAGE PLATE CHARACTERISTICS



FEB. 19 1944

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA HARRISON, NEW JERSEY

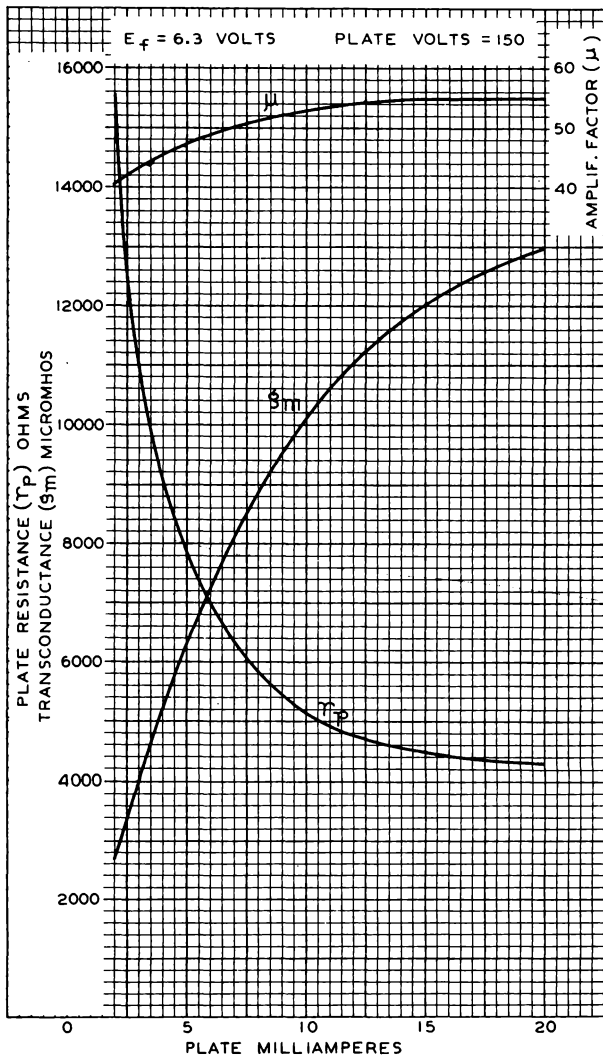
92CM-6543

6J4



6J4

AVERAGE CHARACTERISTICS



MARCH 21, 1944

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA HARRISON, NEW JERSEY

92CM-6548



6L4

6L4

OSCILLATOR TRIODE

ACORN TYPE

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathode:

Voltage. 6.3 ac or dc volts

Current. 0.225 amp

Direct Interelectrode Capacitances:

Grid to Plate. 1.6 $\mu\mu\text{f}$ Grid to Cathode. 1.8 $\mu\mu\text{f}$ Plate to Cathode 0.5 $\mu\mu\text{f}$

* With no external shield.

Mechanical:

Mounting Position. Any

Overall Length $1-7/32" \pm 5/32"$ Overall Diameter (Including radial pins) $1-3/32" \pm 1/16"$

Bulb T-4-1/2

Base Small Radial 7-Pin

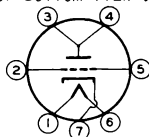
Basing Designation for BOTTOM VIEW 7BR

Pin 1 - Heater

Pin 2 - Grid

Pin 3 - Plate

Pin 4 - Plate



Pin 5 - Grid

Pin 6 - Heater

Pin 7 - Cathode

AMPLIFIER - Class A₁**Maximum Ratings, Design-Center Values:**

PLATE VOLTAGE. 500 max. volts

PLATE DISSIPATION. 1.7 max. watts

PLATE CURRENT. 15 max. ma

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode 80 max. volts

Heater positive with respect to cathode 80 max. volts

Typical Operation and Characteristics:

Plate Voltage. 80 volts

Cathode-Bias Resistor. 150 ohms

Amplification Factor 28

Plate Resistance 4400 ohms

Transconductance 6400 μmhos

Plate Current. 9.5 ma

Maximum Circuit Values (for maximum rated conditions):

Grid-Circuit Resistance:

For fixed bias Not Recommended

For cathode bias 0.5 max. megohm

MAY 20, 1949

TUBE DEPARTMENT

TENTATIVE DATA

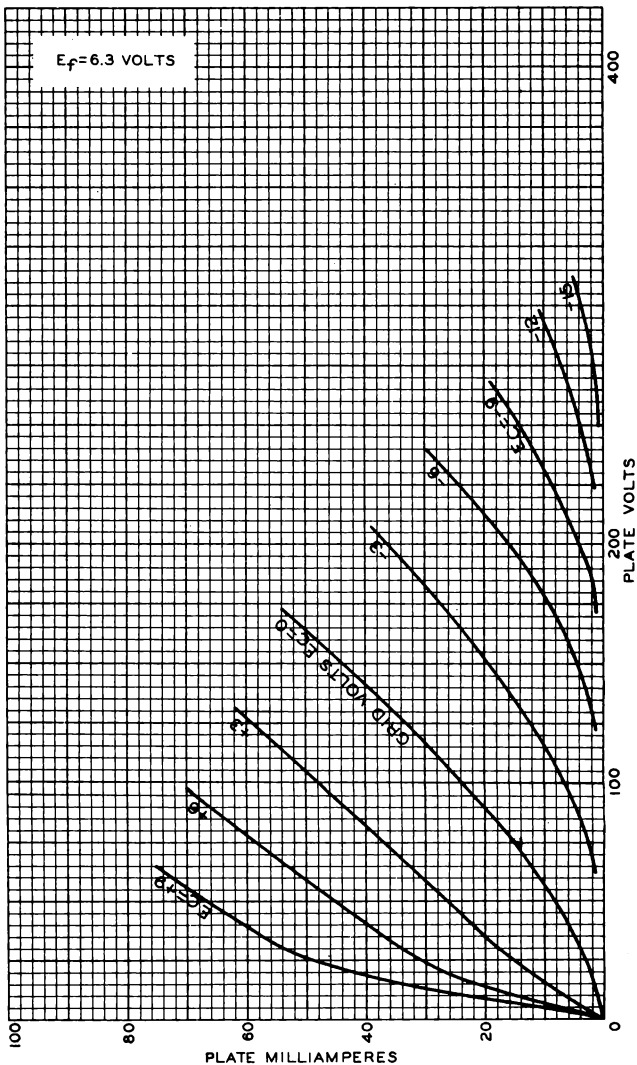
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6L4



6L4

AVERAGE PLATE CHARACTERISTICS



MAR. 8, 1949

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

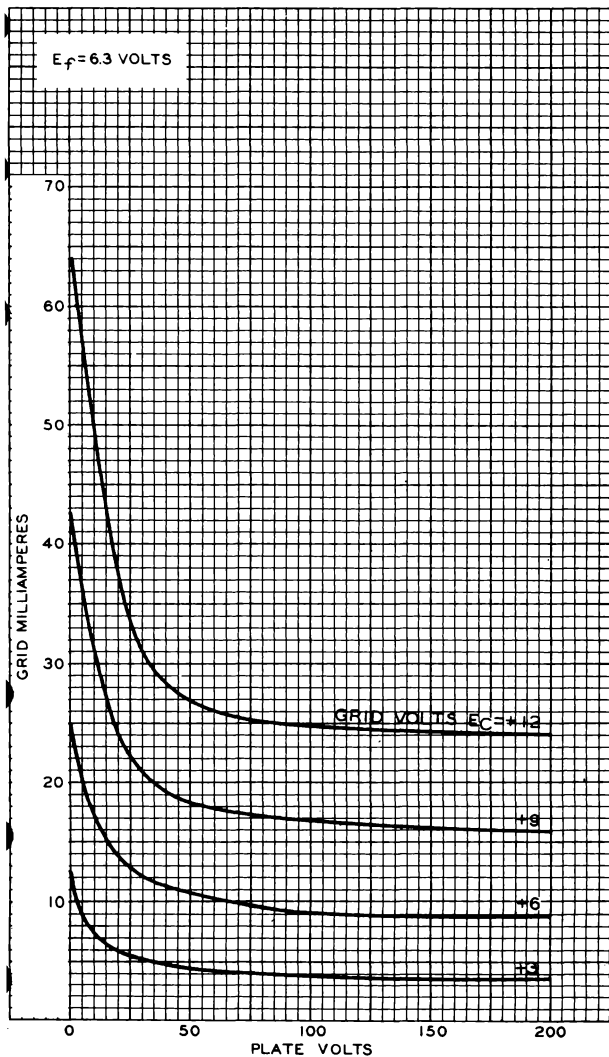
92CM-7199



6L4

6L4

TYPICAL CHARACTERISTICS



MAR. 10, 1949

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7202

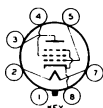


12A6

12A6

BEAM POWER AMPLIFIER

Heater#	Coated Unipotential Cathode	
Voltage	12.6	a-c or d-c volts
Current	0.15	amp.
Direct Interelectrode Capacitances (Approx.):°		
Grid to Plate	0.3	μpf
Input	9.0	μpf
Output	9.0	μpf
Maximum Overall Length	3-1/4"	
Maximum Seated Height	2-11/16"	
Maximum Diameter	1-5/16"	
Bulb	Metal Shell, MT-8	
Base	Small Wafer Octal 7-Pin	
Pin 1 - Shell	Pin 5 - Grid	
Pin 2 - Heater	Pin 7 - Heater	
Pin 3 - Plate	Pin 8 - Cathode	
Pin 4 - Screen		
Mounting Position	Any	



BOTTOM VIEW (7AC)

*Maximum Ratings Are Design-Center Values*AMPLIFIER

Plate Voltage	250 max.	volts
Screen Voltage	250 max.	volts
Plate Dissipation	7.5 max.	watts
Screen Dissipation	1.5 max.	watts

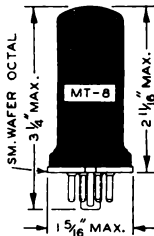
Operating Conditions and Characteristics—Class A₁ Amplifier:

Plate	250	volts
Screen	250	volts
Grid*	-12.5	volts
Peak A-F Grid Voltage	12.5	volts
Zero-Signal Plate Current	30	ma.
Max.—Signal Plate Current	32	ma.
Zero-Signal Screen Current	3.5 approx.	ma.
Max.—Signal Screen Current	5.5 approx.	ma.
Plate Resistance	70000 approx.	ohms
Transconductance	3000	μmhos
Load Resistance	7500	ohms
Total Harmonic Distortion	7	%
Max.—Signal Power Output	3.4	watts

In circuits where the cathode is not directly connected to the heater, the potential difference between heater and cathode should be kept as low as possible.

* The d-c resistance in the grid circuit should not exceed 0.1 megohm when fixed bias is used, or 0.5 megohm when cathode bias is used.

° With shell connected to cathode.



← Indicates a change.

May 1, 1942

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

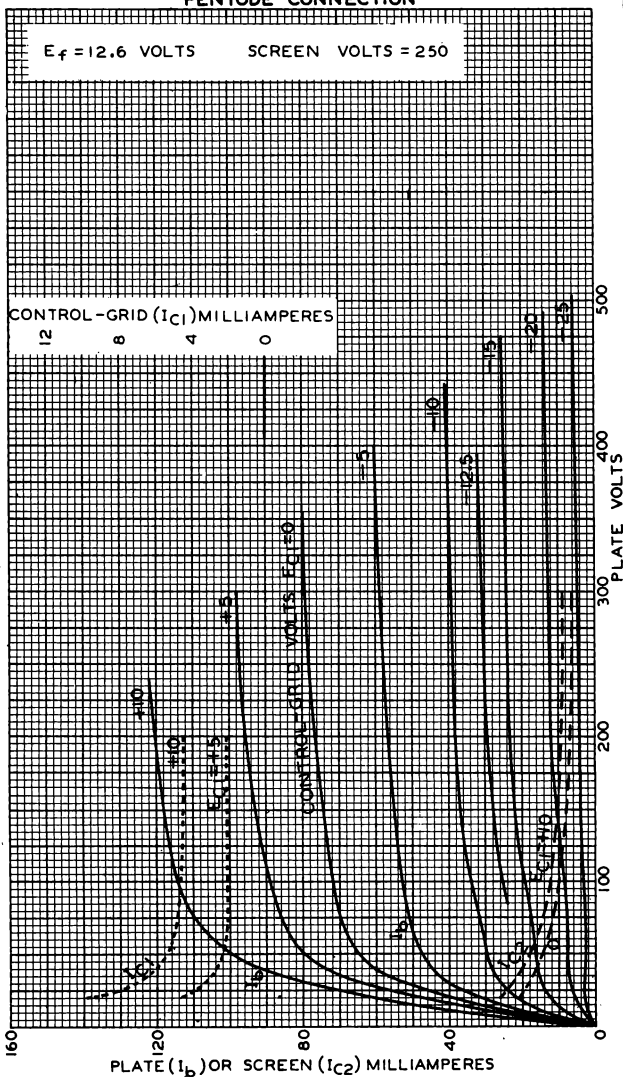
TENTATIVE DATA

12A6



12A6

AVERAGE PLATE CHARACTERISTICS PENTODE CONNECTION



OCT. 14, 1941

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

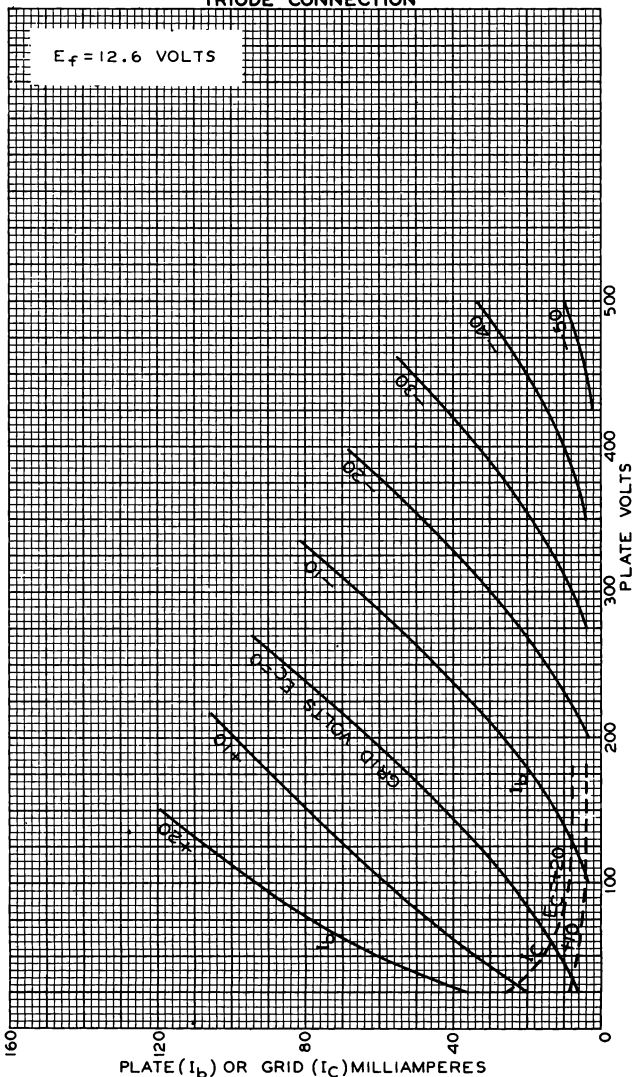
92C-6329



12A6

AVERAGE PLATE CHARACTERISTICS TRIODE CONNECTION

12A6



OCT. 13, 1941

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

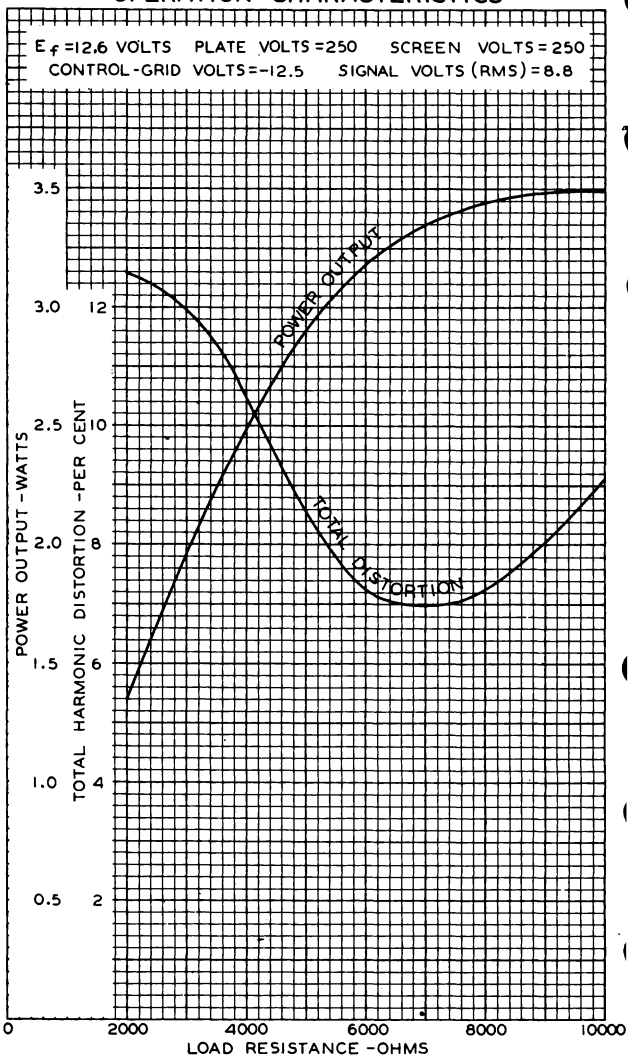
92C-6327

12A6



12A6

OPERATION CHARACTERISTICS



JAN. 10, 1942

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6354



12AY7

MEDIUM-MU TWIN TRIODE

MINIATURE TYPE

12AY7

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:

Heater Arrangement	Series	Parallel
Voltage	12.6*	6.3 ac or dc volts
Current	0.15	0.3 amp

Direct Interelectrode Capacitances (Without External Shield)—Each Unit:

Grid to Plate	1.3	 μmf
Input	1.3	 μmf
Output	0.6	 μmf

Characteristics, Class A₁ Amplifier (Each Unit):

Plate Voltage	250	volts
Grid Voltage	-4	volts
Amplification Factor	40	
Plate Resistance (Approx.)	22800	ohms
Transconductance	1750	μmhos
Plate Current	3	ma
Grid Voltage (Approx.) for plate current of 10 μamp	-11	volts

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" $\pm$ 3/32"
Maximum Diameter	7/8"
Bulb	T-6-1/2
Base	Small-Button Noval 9-Pin (JETEC No. E9-1)
Basing Designation for BOTTOM VIEW	9A

Pin 1—Plate of
Unit No.2
Pin 2—Grid of
Unit No.2
Pin 3—Cathode of
Unit No.2
Pin 4—Heater
Pin 5—Heater



Pin 6—Plate of
Unit No.1
Pin 7—Grid of
Unit No.1
Pin 8—Cathode of
Unit No.1
Pin 9—Heater
Mid-Tap

* use of the 12.6-volt connection with an ac-heater supply is not recommended for applications involving low hum..

(continued on next page)

12AY7



12AY7

MEDIUM-MU TWIN TRIODE

AMPLIFIER—Class A₁

Values are for each unit

Maximum Ratings, Design—Center Values:

PLATE VOLTAGE	300 max.	volts
GRID VOLTAGE:		
Negative bias value	50 max.	volts
Positive bias value	0 max.	volts
PLATE DISSIPATION	1.5 max.	watts
CATHODE CURRENT	10 max.	ma
PEAK HEATER—CATHODE VOLTAGE:		
Heater negative with respect to cathode	90 max.	volts
Heater positive with respect to cathode	90 max.	volts

Typical Operation as Resistance-Coupled Amplifier:

*See RESISTANCE-COUPLED AMPLIFIER CHART No.28
at front of Receiving Tube Section*

APRIL 1, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

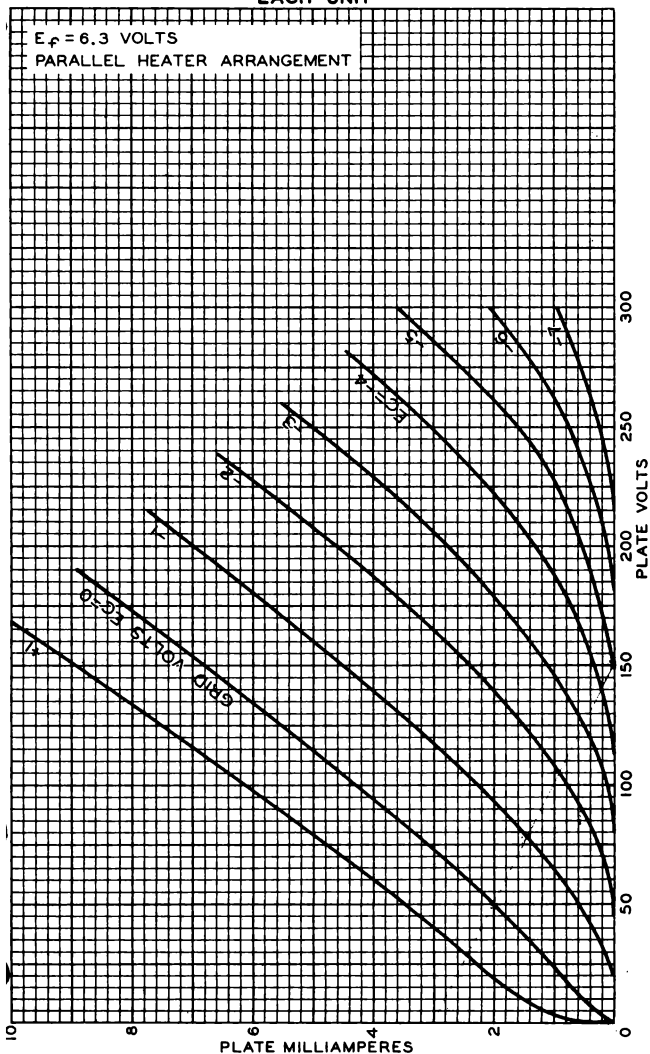
TENTATIVE DATA



12AY7

12AY7

AVERAGE PLATE CHARACTERISTICS EACH UNIT



NOV. 5, 1952

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7861



12L8-GT

12L8-GT

TWIN-PENTODE POWER AMPLIFIER

Heater	Coated Unipotential Cathode
Voltage	12.6 a-c or d-c volts
Current	0.15 amp.

Direct Interelectrode Capacitances (Approx.):^o

	Pentode Unit P ₁	Pentode Unit P ₂	
Grid to Plate	0.7	0.7	μμf
Input	5.0	5.0	μμf
Output	6.0	6.0	μμf
Grid to Grid	0.08		μμf
Plate to Plate	1.5		μμf
Grid P ₁ to Plate P ₂	0.2		μμf
Grid P ₂ to Plate P ₁	0.1		μμf

Maximum Overall Length 3-5/16"

Maximum Seated Height 2-3/4"

Maximum Diameter 1-5/16"

Bulb T-9

Base Intermediate Shell Octal 8-Pin

Pin 1-Grid P₁ Pin 4-Plate P₂

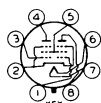
Pin 2- { Cathode, Suppressor P₁ & P₂ Pin 5-Screen P₁ & P₂

Pin 3-Grid P₂ Pin 6-Heater

Pin 7-Heater

Pin 8-Plate P₁

Mounting Position BOTTOM VIEW (8BU) Any



For convenience, one pentode unit is identified as P₁; the other as P₂.

Maximum Ratings Are Design-Center Values

AMPLIFIER - Each Unit

Plate Voltage	180 max.	volts
Screen Voltage	180 max.	volts
Plate Dissipation	2.5 max.	watts
Screen Dissipation	1.0 max.	watt
D-C Heater-Cathode Potential	100 max.	volts
Typical Operation and Characteristics - Class A₁ Amplifier:		
Plate Voltage	180	volts
Screen Voltage	180	volts
Grid Voltage (Grid No.1)	-9	volts
Peak A-F Grid Voltage	9	volts
Zero-Sig. Plate Cur.	13	ma.
Max.-Sig. Plate Cur.	13.5	ma.
Zero-Sig. Screen Cur.	2.8	ma.
Max.-Sig. Screen Cur.	4.6	ma.
Plate Resistance	0.16	megohm
Transconductance	2150	μmhos
Load Resistance	10000	ohms
Power Output (Total harmonic dist. 10%)	1.0	watt

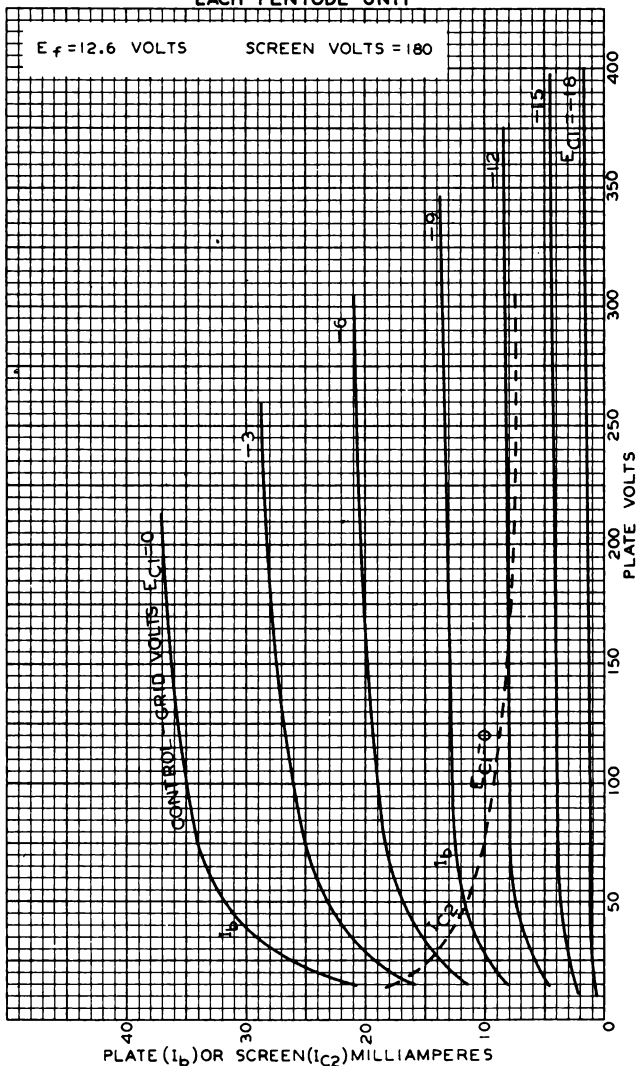
^o With no external shield.

12L8-GT



12L8-GT

AVERAGE PLATE CHARACTERISTICS EACH PENTODE UNIT



OCT. 1, 1943

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92C-6391



12SW7

DUPLEX-DIODE TRIODE*For use with 12-cell storage-battery supply*

12SW7

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathode:

Voltage. 12.6 ac or dc volts

Current. 0.15 amp.

Direct Interelectrode Capacitances—Triode Unit:^oGrid to Plate. 2.4 μmf Grid to Cathode. 3.0 μmf Plate to Cathode 2.8 μmf **Mechanical:**

Mounting Position. Any

Maximum Overall Length 2-5/8"

Maximum Seated Length. 2-1/16"

Maximum Diameter 1-5/16"

Bulb Metal Shell, MT8G

Base Small Wafer Octal 8-Pin

Basing Designation for BOTTOM VIEW 8Q

Pin 1—Shell Pin 5—Diode Plate

Pin 2—Triode Grid No. 1

Pin 3—Cathode Pin 6—Triode Plate

Pin 4—Diode Plate Pin 7—Heater

No. 2 Pin 8—Heater

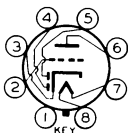
CLASS A₁ AMPLIFIER**Maximum Ratings, Design-Center Values:**

PLATE VOLTAGE. 250 max. volts

PLATE DISSIPATION. 2.5 max. watts

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode. 90 max. volts

Heater positive with respect to cathode. 90 max. volts

Characteristics:

Plate Voltage. 26.5 250 volts

Grid Voltage:

From a fixed supply of - -9 volts

From a grid resistor of. 2 - megohms

Amplification Factor 17 16

Plate Resistance 15500 8500 ohms

Transconductance 1100 1900 μmhos

Plate Current. 1.1 9.5 ma.

Typical Operation with Resistance Coupling:

See RESISTANCE-COUPLED AMPLIFIER CHART, Type 6R7.

^o With shell connected to cathode. Values are approximate.

12SW7



12SW7

DUPLEX-DIODE TRIODE

DIODE UNITS - Two

The two diode plates are placed around a cathode, the sleeve of which is common to the triode unit. Each diode plate has its own base pin. Diode curves in the front of the RECEIVING TUBE SECTION apply to the 12SW7.

*Additional curves applying to the 12SW7
are shown under Types 6R7, and 6SR7*



12SX7-GT

12SX7-GT

TWIN-TRIODE AMPLIFIER

For use with 12-cell storage-battery supply

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathode:

Voltage. 12.6 ac or dc volts

Current. 0.3 amp

Direct Interelectrode Capacitances (Approx.):⁰

	<u>Triode Unit No. 1</u>	<u>Triode Unit No. 2</u>	
Grid to Plate.	3.6	3.6	μμf
Grid to Cathode.	3.0	2.8	μμf
Plate to Cathode.	0.8	1.2	μμf

Mechanical:

Mounting Position. Any

Maximum Overall Length. 3-5/16"

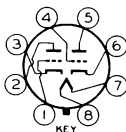
Maximum Seated Length. 2-3/4"

Maximum Diameter. 1-5/16"

Bulb T-9

Base Intermediate Shell Octal 8-Pin

Basing Designation for BOTTOM VIEW. 8BD

Pin 1—Grid of
Unit No. 2Pin 2—Plate of
Unit No. 2Pin 3—Cathode of
Unit No. 2Pin 4—Grid of
Unit No. 1Pin 5—Plate of
Unit No. 1Pin 6—Cathode of
Unit No. 1

Pin 7—Heater

Pin 8—Heater

CLASS A₁ AMPLIFIER

Values are for each unit

Maximum Ratings, Design-Center Values:

PLATE VOLTAGE. 300 max. volts

GRID VOLTAGE:

Negative bias value. 50 max. volts

Positive bias value. 0 max. volts

CATHODE CURRENT. 20 max. ma.

PLATE DISSIPATION. 2.5 max. watts

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode 90 max. volts

Heater positive with respect to cathode 90 max. volts

Typical Operation and Characteristics:

Plate Voltage. 26.5 90 250 volts

Grid Voltage:

From a fixed supply of — 0 —8 volts

From a grid resistor of 0.05 — — megohm

Amplification Factor 21 20 20

Plate Resistance 11500 6700 7700 ohms

⁰ with no external shield.

JUNE 20, 1946

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA

12SX7-GT



12SX7-GT

TWIN-TRIODE AMPLIFIER

Transconductance	1800	3000	2600	μ mos
Plate Current.	1.8	10	9.0	ma.

Maximum Circuit Values (for maximum rated conditions):

Grid-Circuit Resistance per unit. 1.0 max. megohm

Typical Operation with Resistance Coupling:

See RESISTANCE-COUPLED AMPLIFIER CHART, Type 6F8-G.

*The curves under Types 6J5 and 6SN7-GT
also apply to each unit of the
12SX7-GT*

JUNE 20, 1946

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

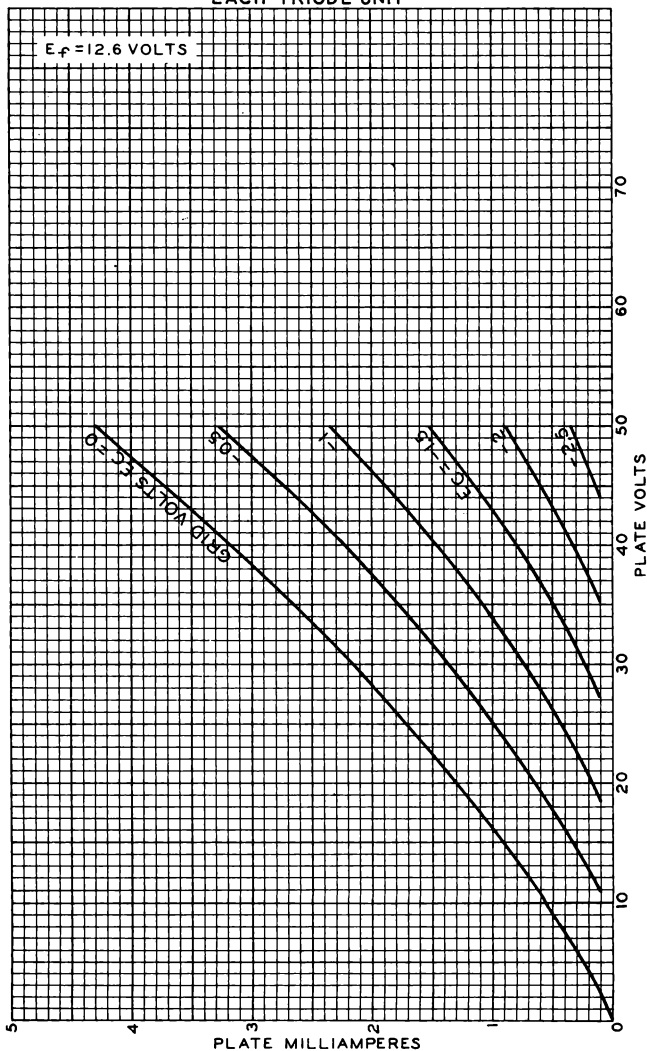
TENTATIVE DATA



12SX7-GT

12SX7-GT

AVERAGE PLATE CHARACTERISTICS EACH TRIODE UNIT



JULY 11, 1946

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6782



12SY7

PENTAGRID CONVERTER

SINGLE-ENDED METAL TYPE

For use with 12-cell storage-battery supply

12SY7

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathode:

Voltage. 12.6 ac or dc volts

Current. 0.15 amp

Direct Interelectrode Capacitances:

Grid No.3 to All Other Electrodes (RF Input) 9.5 μ fPlate to All Other Electrodes (Mixer Output) 12 μ fGrid No.1 to All Other Electrodes (Osc. Input) 7 μ fGrid No.3 to Plate 0.13 max. μ fGrid No.1 to Grid No.3 0.15 max. μ fGrid No.1 to Plate 0.06 max. μ f

Grid No.1 to Shell, Grid No.5, and All

Other Electrodes Except Cathode 4.4 μ fGrid No.1 to Cathode 2.6 μ f

Cathode to Shell, Grid No.5, and All

Other Electrodes Except Cathode 5 μ f**Mechanical:**

Mounting Position. Any

Maximum Overall Length 2-5/8"

Maximum Seated Length. 2-1/16"

Maximum Diameter 1-5/16"

Bulb Metal Shell, MT-8G

Base Small Wafer Octal 8-Pin

Basing Designation for BOTTOM VIEW 8R

Pin 1 - Shell, Pin 5 - Grid No.1

Grid No.5 Pin 6 - Cathode

Pin 2 - Heater Pin 7 - Heater

Pin 3 - Plate Pin 8 - Grid No.3

Pin 4 - Grids No.2 &

No.4

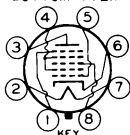
CONVERTER**Maximum Ratings, Design-Center Values:**

PLATE VOLTAGE. 300 max. volts

GRIDS-No.2 and No.4 (SCREEN) VOLTAGE . . . 100 max. volts

GRIDS-No.2 and No.4 SUPPLY VOLTAGE . . . 300 max. volts

PLATE DISSIPATION. 1.0 max. watt

GRIDS-No.2 & No.4 DISSIPATION. 1.0 max. watt

TOTAL CATHODE CURRENT. 14 max. ma.

GRID-No.3 (CONTROL GRID) VOLTAGE:

Negative bias value. 50 max. volts

Positive bias value. 0 max. volts

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode 90 max. volts

Heater positive with respect to cathode 90 max. volts

● With shell connected to cathode.

12SY7



12SY7

PENTAGRID CONVERTER

Characteristics - Separate Excitation: *

Plate Voltage.	26.5	100	250	volts
Grids-No.2 & No.4 Voltage	26.5	100	100	volts
Grid-No.3 Voltage.	-1	-2	-2	volts
Grid-No.1 (Oscillator Grid) Resistor	20000	20000	20000	ohms
Plate Resistance (Approx.)	-	0.5	1.0	megohm
Conversion Transconductance	250	425	450	μmhos
Conversion Transconductance (Approx.)	8 [♣]	2 [□]	2 [□]	μmhos
Plate Current.	0.45	3.3	3.5	ma.
Grids-No.2 & No.4 Current	1.7	8.5	8.5	ma.
Grid-No.1 Current.	0.1	0.5	0.5	ma.
Total Cathode Current. . .	2.25	12.3	12.5	ma.

NOTE: The transconductance between grid No.1 and grids No.2 and No.4 connected to plate (not oscillating) is approximately 4500 μmhos under the following conditions: grids No.1, No.3, No.5 and shell at 0 volts; grids No.2 and No.4 and plate at 100 volts. Under the same conditions, the plate current is 27 milliamperes, and the amplification factor is 13.

* The characteristics shown with separate excitation correspond very closely with those obtained in a self-excited oscillator circuit operating with zero bias.

♣ With grid-No.3 bias of -6 volts.

□ With grid-No.3 bias of -35 volts.

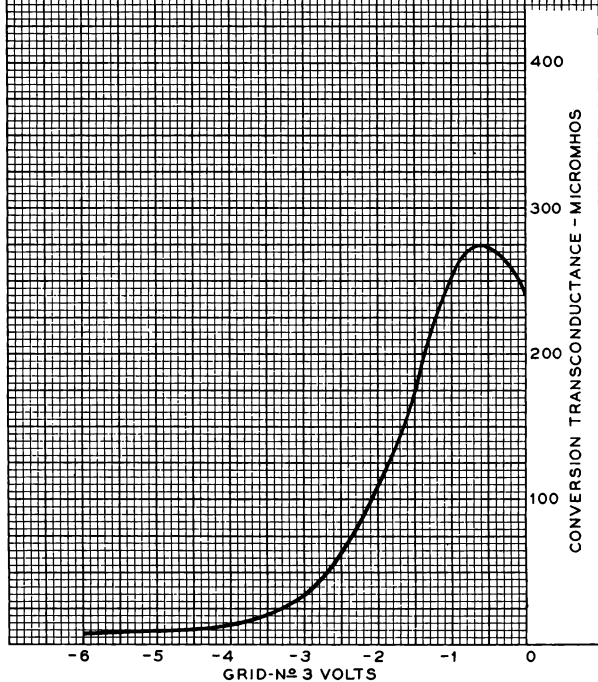
*The curves under Type 6SA7 also
apply to the 12SY7.*



12SY7

12SY7 OPERATION CHARACTERISTICS WITH SEPARATE OSCILLATOR EXCITATION

$E_f = 12.6$ VOLTS
PLATE VOLTS = 26.5
GRIDS - N^o 2 & N^o 4 VOLTS = 26.5
GRID - N^o 1 MILLIAMPERES = 0.1
GRID - N^o 1 RESISTOR - OHMS = 20000



JULY 29, 1946

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

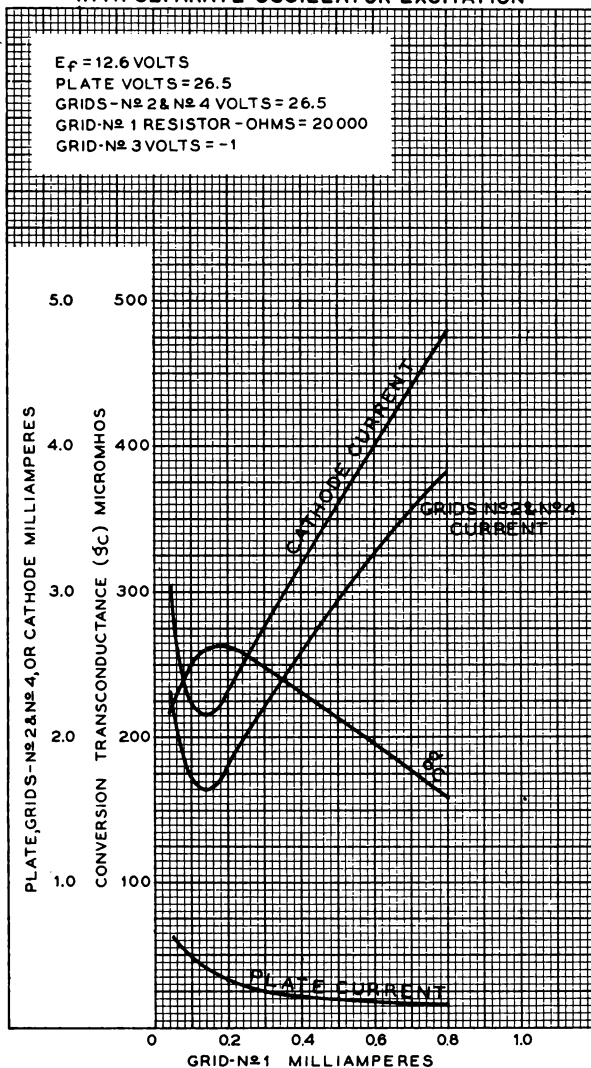
92C M - 6786

12SY7



12SY7

OPERATION CHARACTERISTICS WITH SEPARATE OSCILLATOR EXCITATION



JULY 30, 1946

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6787



26A6

R-F AMPLIFIER PENTODE

MINIATURE REMOTE-CUTOFF TYPE

For use with 12-cell storage-battery supply

26A6

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathode:

Voltage. 26.5 ac or dc volts

Current. 0.07 amp

Direct Interelectrode Capacitances:⁰Grid No.1 to Plate . . . 0.0035 max. μf Input. 6.0 μf Output 5.0 μf **Mechanical:**

Mounting Position. Any

Maximum Overall Length 2-1/8"

Maximum Seated Length. 1-7/8"

Length from Base Seat to

Bulb Top (excluding tip) 1-1/2" $\pm$ 3/32"

Maximum Diameter 3/4"

Bulb T-5-1/2

Base Miniature Button 7-Pin

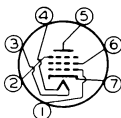
Basing Designation for BOTTOM VIEW 7BK1

Pin 1-Grid No.1

Pin 2-Grid No.3,

Internal Shield

Pin 3-Heater



Pin 4-Heater

Pin 5-Plate

Pin 6-Grid No.2

Pin 7-Cathode

CLASS A₁ AMPLIFIER**Maximum Ratings, Design-Center Values:**

PLATE VOLTAGE. 250 max. volts

GRID-No.2 (SCREEN) VOLTAGE 100 max. volts

GRID-No.2 SUPPLY VOLTAGE 250 max. volts

PLATE DISSIPATION. 3 max. watts

GRID-No.2 DISSIPATION. 0.4 max. watt

GRID-No.1 (CONTROL GRID) VOLTAGE:

Negative bias value. 50 max. volts

Positive bias value. 0 max. volts

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode 90 max. volts

Heater positive with respect to cathode 90 max. volts

Typical Operation and Characteristics:

Plate Voltage. 26.5 250 volts

Grid No.3 (Suppressor) Connected to cathode at socket

Grid-No.2 Voltage. 26.5 100 volts

Grid-No.1 Voltage:

From a grid-No.1 resistor of 2 - megohms

From a cathode resistor of - 125 ohms

⁰ with external shield connected to cathode.

26A6



26A6

R-F AMPLIFIER PENTODE

Plate Resistance (Approx.)	0.25	1.0	megohm.
Transconductance.	2000	4000	μ mhos
Grid-No.1 Bias (Approx.) for transconductance of 40 μ mhos	-	-25	volts
Grid-No.1 Bias (Approx.) for transconductance of 20 μ mhos	-8	-	volts
Plate Current	1.7	10.5	ma.
Grid-No.2 Current	0.7	4.0	ma.

JUNE 20, 1946

TUBE DIVISION

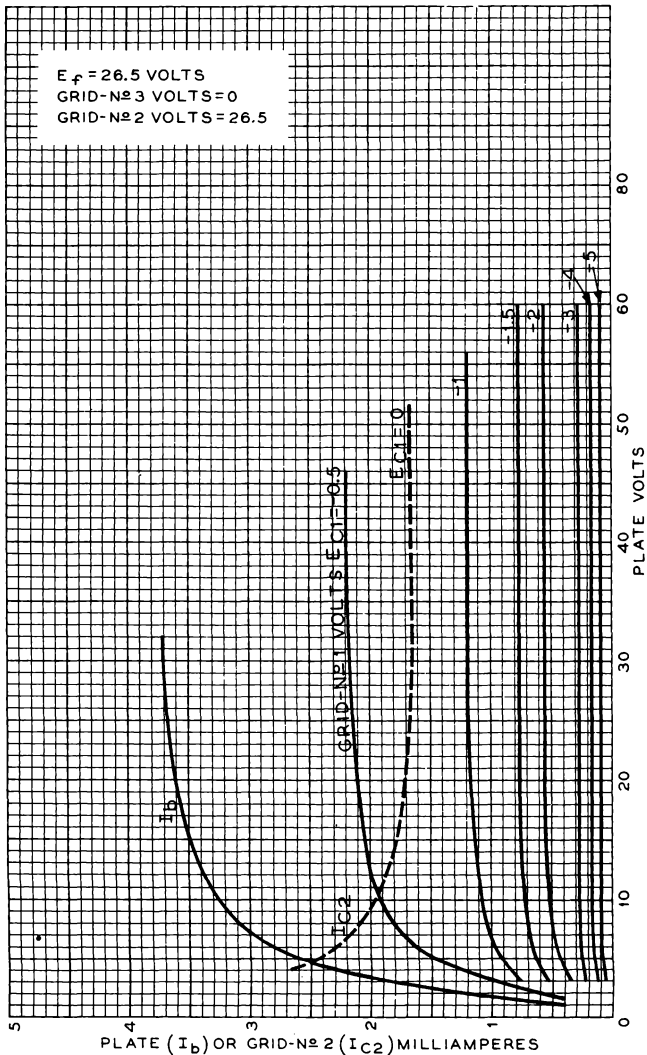
TENTATIVE DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



26A6

AVERAGE PLATE CHARACTERISTICS



JULY 24, 1948

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

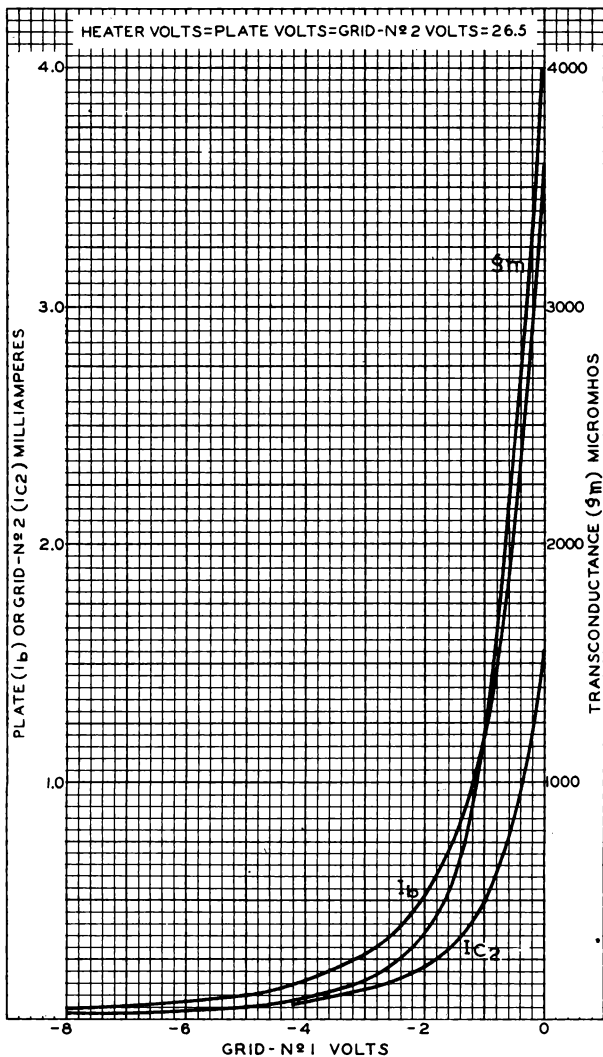
92CM-6788

26A6



26A6

AVERAGE CHARACTERISTICS



JUNE 25, 1946

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

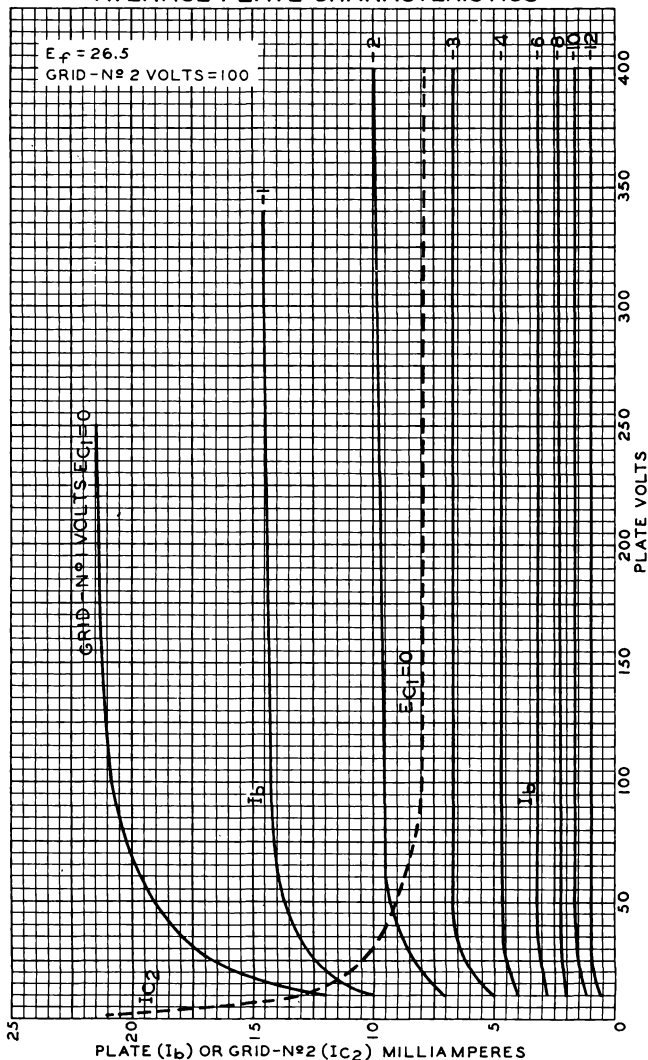
92CM-6778



26A6

26A6

AVERAGE PLATE CHARACTERISTICS



JULY 18, 1946

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6784



26A7-GT

26A7-GT

TWIN BEAM POWER TUBE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage. 26.5 ac or dc volts

Current. 0.6 amp

Direct Interelectrode Capacitances (Approx.):^o

Grid No.1 to plate[▲] 1.2 μ f

Grid No.1 to cathode & grid No.3,

grid No.2, and heater[▲] 16 μ f

Plate to cathode & grid No.3,

grid No.2, and heater[▲] 13 μ f

Grid No.1 of unit No.1 to

grid No.1 of unit No.2 0.2 μ f

Plate of unit No.1 to

plate of unit No.2 0.2 μ f

Grid No.1 of unit No.1 to

plate of unit No.2 0.2 μ f

Grid No.1 of unit No.2 to

plate of unit No.1 0.2 μ f

Mechanical:

Mounting Position. Any

Maximum Overall Length 3-13/16"

Maximum Seated Length. 3-1/4"

Maximum Diameter 1-9/32"

Bulb T-9

Base Intermediate-Shell Octal 8-Pin (JETEC No.88-6),

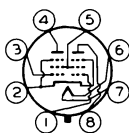
or Short Intermediate-Shell Octal 8-Pin (JETEC No.88-58)

Basing Designation for BOTTOM VIEW 8BU

Pin 1 - Grid No.1 of
Unit No.1

Pin 2 - Cathode,
Grid No.3
of Units

Pin 3 - Grid No.1 of
Unit No.2



Pin 4 - Plate of
Unit No.2

Pin 5 - Grid No.2
of Units
No.1 & No.2

Pin 6 - Heater

Pin 7 - Heater

Pin 8 - Plate of
Unit No.1

AMPLIFIER - Class A₁

Values are for Each Unit

Maximum Ratings, Design-Center Values:

PLATE VOLTAGE. 50 max. volts

GRID-No.2 (SCREEN) VOLTAGE 50 max. volts

PLATE DISSIPATION. 2 max. watts

^o Without external shield.

[▲] Each unit.

←Indicates a change.

26A7-GT



26A7-GT

TWIN BEAM POWER TUBE

GRID-No.2 INPUT.	0.5 max.	watt
→ PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode. .	90 max.	volts
Heater positive with respect to cathode. .	90 max.	volts
→ Typical Operation and Characteristics (Each unit):		
Plate Voltage	26.5	volts
Grid-No.2 Voltage.	26.5	volts
Grid-No.1 (Control-Grid) Voltage	-4.5	volts
Peak AF Grid-No.1 Voltage.	4.5	volts
Zero-Signal Plate Current.	20	ma
Max.-Signal Plate Current.	20.5	ma
Zero-Signal Grid-No.2 Current.	1.9	ma
Max.-Signal Grid-No.2 Current.	5.5	ma
Transconductance	5700	μmhos
Load Resistance.	1500	ohms
Total Harmonic Distortion.	7	%
Max.-Signal Power Output	180	mw

→ **Maximum Circuit Values:**

Grid-No.1-Circuit Resistance:

For maximum rated conditions:

With cathode bias. 0.5 max. megohm

With fixed bias. 0.1 max. megohm

For conditions where the maximum
design values of plate voltage and
grid-No.2 voltage do not exceed
26.5 volts:

With grid-resistor bias. 0.5 max. megohm

AF POWER AMPLIFIER - Class AB₁*Unless otherwise specified, values are on a Per-Tube Basis***Maximum Ratings, Design-Center Values:**

PLATE VOLTAGE.	50 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	50 max.	volts
PLATE DISSIPATION (Per unit)	2 max.	watts
GRID-No.2 INPUT (Per unit)	0.5 max.	watt
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode. .	90 max.	volts
Heater positive with respect to cathode. .	90 max.	volts

Typical Push-Pull Operation:

Plate Voltage.	26.5	volts
Grid-No.2 Voltage.	26.5	volts
Grid-No.1 (Control-Grid) Voltage	-7	volts
Peak AF Grid-No.1-to-		
Grid No.1 Voltage.	14	volts
Zero-Signal Plate Current.	19	ma

→ Indicates a change.



26A7-GT

26A7-GT

TWIN BEAM POWER TUBE

Max.-Signal Plate Current.	30	ma
Zero-Signal Grid-No.2 Current (Approx.). .	2	ma
Max.-Signal Grid-No.2 Current (Approx.). .	8.5	ma
Effective Load Resistance (Plate to plate)	2500	ohms
Total Harmonic Distortion.	5	%
Max.-Signal Power Output	500	mw

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:

For maximum rated conditions:

With cathode bias. 0.5 max. megohm

With fixed bias. 0.1 max. megohm

For conditions where the maximum
design values of plate voltage and
grid-No.2 voltage do not exceed
26.5 volts:

With grid-resistor bias. 0.5 max. megohm

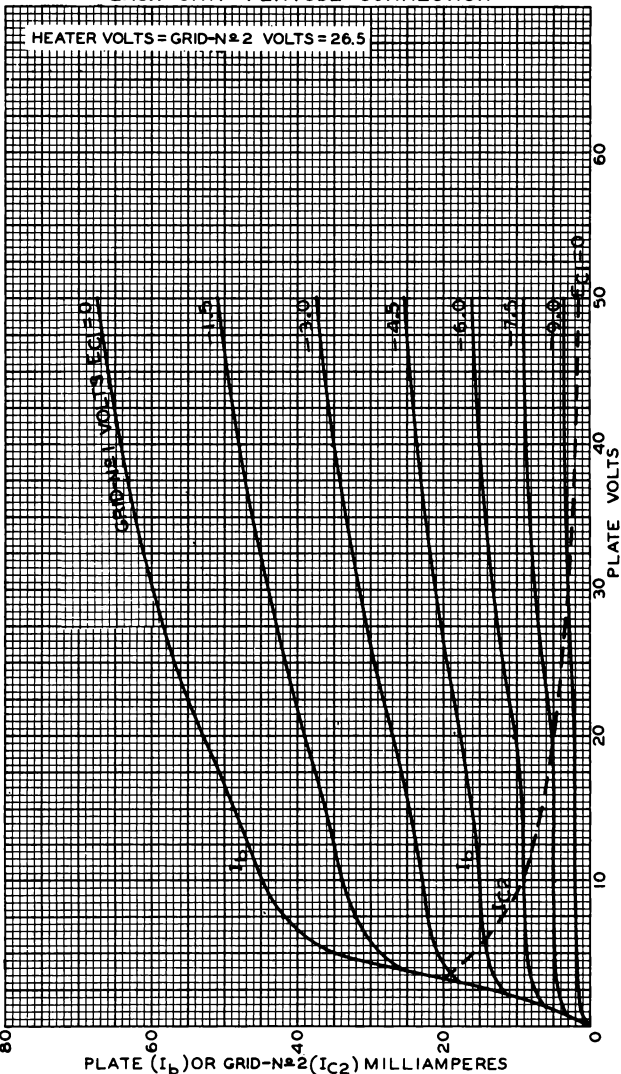
←Indicates a change.

26A7-GT



26A7-GT

AVERAGE PLATE CHARACTERISTICS EACH UNIT - PENTODE CONNECTION



JAN. 3, 1955

TUBE DIVISION

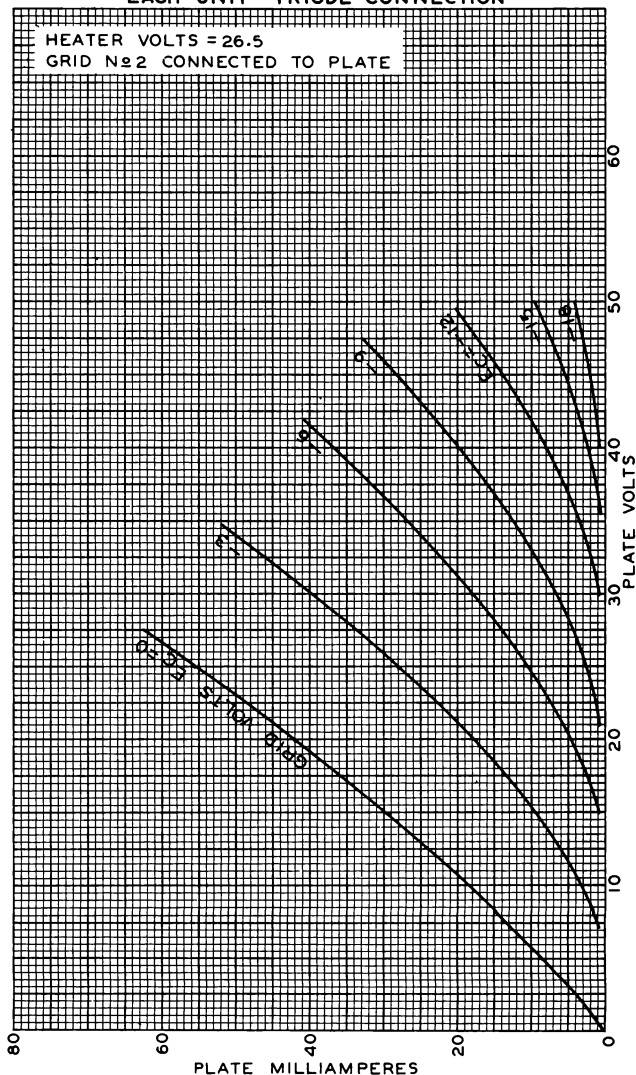
92CM-6509RI

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



26A7-GT

26A7-GT AVERAGE PLATE CHARACTERISTICS EACH UNIT - TRIODE CONNECTION



MAR. 24, 1945

TUBE DIVISION

92CM-6510

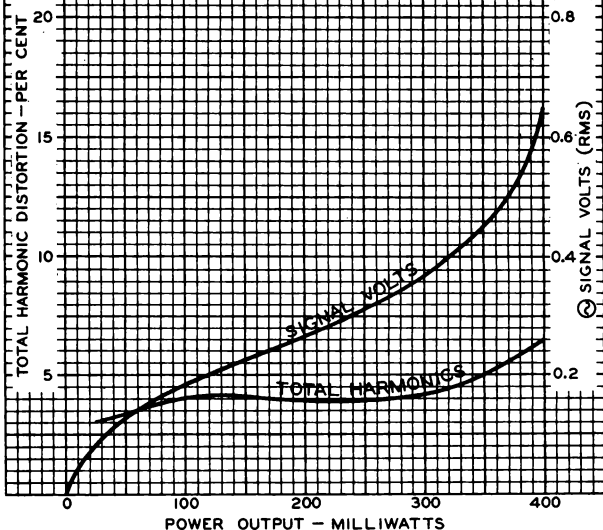
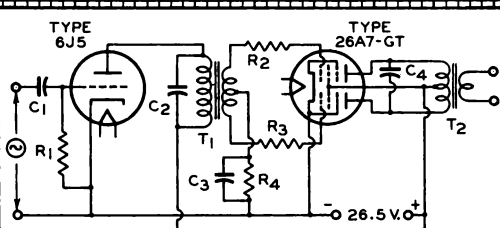
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

26A7-GT



26A7-GT OPERATION CHARACTERISTICS PUSH-PULL CIRCUIT

HEATER VOLTS = 26.5





26C6 DUPLIX-DIODE TRIODE

MINIATURE TYPE

For use with 12-cell storage-battery supply

26C6

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage. 26.5 ac or dc volts

Current. 0.07 amp

Direct Interelectrode Capacitances:⁰

Triode Unit: Grid to Plate 2.0 μmf

Grid to Cathode & Heater. 1.8 μmf

Plate to Cathode & Heater 1.4 μmf

Mechanical:

Mounting Position. Any

Maximum Overall Length 2-1/8"

Maximum Seated Length. 1-7/8"

Length from Base Seat to

Bulb Top (excluding tip) 1-1/2" $\pm$ 3/32"

Maximum Diameter 3/4"

Bulb T-5-1/2

Base Miniature Button 7-Pin

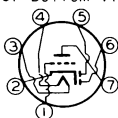
Basing Designation for BOTTOM VIEW 7BT

Pin 1-Triode Grid

Pin 2-Cathode

Pin 3-Heater

Pin 4-Heater



Pin 5-Diode Plate No.2

Pin 6-Diode Plate No.1

Pin 7-Triode Plate

TRIODE UNIT - Class A₁ AMPLIFIER

Maximum Ratings, Design-Center Values:

PLATE VOLTAGE. 250 max. volts

PLATE DISSIPATION. 2.5 max. watts

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode 90 max. volts

Heater positive with respect to cathode 90 max. volts

Characteristics:

Plate Voltage. 26.5 250 volts

Grid Voltage:

From a fixed supply of - -9 volts

From a grid resistor of. 2.0 - megohms

Amplification Factor 17 16

Plate Resistance 15500 8500 ohms

Transconductance 1100 1900 μmhos

Plate Current. 1.1 9.5 ma.

Typical Operation with Resistance Coupling:

See RESISTANCE-COUPLED AMPLIFIER CHART, Type 6R7.

⁰ With external shield connected to cathode. Values are approximate.

26C6



26C6

DUPLEX-DIODE TRIODE

DIODE UNITS - Two

The two diode plates are placed around a cathode, the sleeve of which is common to the triode unit. Each diode plate has its own base pin. Diode curves in the front of the RECEIVING TUBE SECTION apply to the 26C6.

*Additional curves applying to the 26C6
are shown under Types 6R7, and 6SR7*

JUNE 20, 1946

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

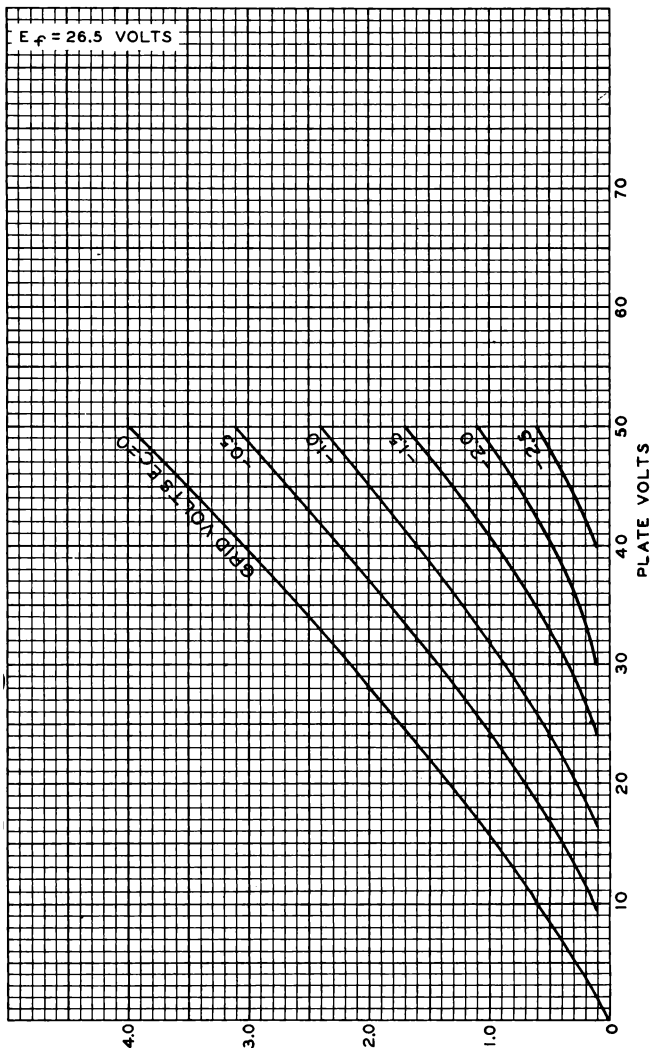
TENTATIVE DATA



26C6

26C6

AVERAGE PLATE CHARACTERISTICS



JUNE 10, 1946

PLATE MILLIAMPERES
TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6772

**26D6****PENTAGRID CONVERTER**

MINIATURE TYPE

For use with 12-cell storage-battery supply

26D6GENERAL DATA**Electrical:**

Heater, for Unipotential Cathode:

Voltage. 26.5 ac or dc volts

Current. 0.07 amp

Direct Interelectrode Capacitances:

Grid #3 to All Other Electrodes (RF Input) 7.5[●] μμfPlate to All Other Electrodes (Mixer Output) 14[●] μμfGrid #1 to All Other Electrodes (Osc. Input) 5.8[●] μμfGrid #3 to Plate 0.30 max. [●] μμfGrid #1 to Grid #3 0.15 max. [●] μμfGrid #1 to Plate 0.03 max. [●] μμf

Grid #1 to External Shield and All Other

Electrodes Except Cathode & Grid No.5 2.9 μμf

Grid #1 to Cathode & Grid #5 2.8[▲] μμf

Cathode to External Shield and All Other

Electrodes Except Grid #1 15.5 μμf

Mechanical:

Mounting Position. Any

Maximum Overall Length 2-1/8"

Maximum Seated Length. 1-7/8"

Length from Base Seat to

Bulb Top (excluding tip) 1-1/2" ± 3/32"

Maximum Diameter 3/4"

Bulb T-5-1/2

Base Miniature Button 7-Pin

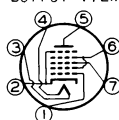
Basing Designation for BOTTOM VIEW. 7CH

Pin 1 - Grid No.1

Pin 2 - Cathode,
Grid No.5

Pin 3 - Heater

Pin 4 - Heater



Pin 5 - Plate

Pin 6 - Grid No.2,
Grid No.4

Pin 7 - Grid No.3

CONVERTER**Maximum Ratings, Design-Center Values:**

PLATE VOLTAGE. 300 max. volts

GRIDS-No.2 & No.4 (SCREEN) VOLTAGE 100 max. volts

GRIDS-No.2 & No.4 SUPPLY VOLTAGE 300 max. volts

PLATE DISSIPATION. 1.0 max. watt

GRIDS-No.2 & No.4 DISSIPATION. 1.0 max. watt

TOTAL CATHODE CURRENT. 14 max. ma.

GRID-No.3 (CONTROL GRID) VOLTAGE:

Negative bias value. 50 max. volts

Positive bias value. 0 max. volts

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode 90 max. volts

Heater positive with respect to cathode 90 max. volts

[●] with external shield connected to cathode.[▲] with external shield connected to other electrodes.

JUNE 20, 1946

TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA

26D6



26D6

PENTAGRID CONVERTER

Characteristics - Separate Excitation:[□]

Plate Voltage.	26.5	100	250	volts
Grids-No.2 & No.4 Voltage. .	26.5	100	100	volts
Grid-No.3 Voltage.	-0.5	-1.5	-1.5	volts
Grid-No.1 (Oscillator- Grid) Resistor	20000	20000	20000	ohms
Plate Resistance (Approx.) .	-	0.5	1.0	megohm
Conversion Transconductance	270	455	475	μmhos
Conversion Transconductance (Approx.)*	-	4	4	μmhos
Conversion Transconductance (Approx.)**	8	-	-	μmhos
Plate Current.	0.45	2.8	3.0	ma.
Grids-No.2 & No.4 Current. .	1.6	8.0	7.8	ma.
Grid-No.1 Current.	0.1	0.5	0.5	ma.
Total Cathode Current. . . .	2.15	11.3	11.3	ma.

Characteristics of Oscillator Section:[▲]

Plate Voltage.	26.5	100	volts
Grids-No.2 & No.4 Voltage. . . .	26.5	100	volts
Grid-No.3 Voltage.	0	0	volts
Grid-No.1 Voltage.	0	0	volts
Amplification Factor	-	22	
Transconductance	4500	7200	μmhos
Plate Current.	5.5	27	ma.

□ The characteristics shown with separate excitation correspond very closely with those obtained in a self-excited oscillator circuit operating with zero bias.

* With grid-No.3 bias of -30 volts.

** With grid-No.3 bias of -6 volts.

▲ Measured between grid No.1 and grids-No.2 and No.4 connected to plate (not oscillating).

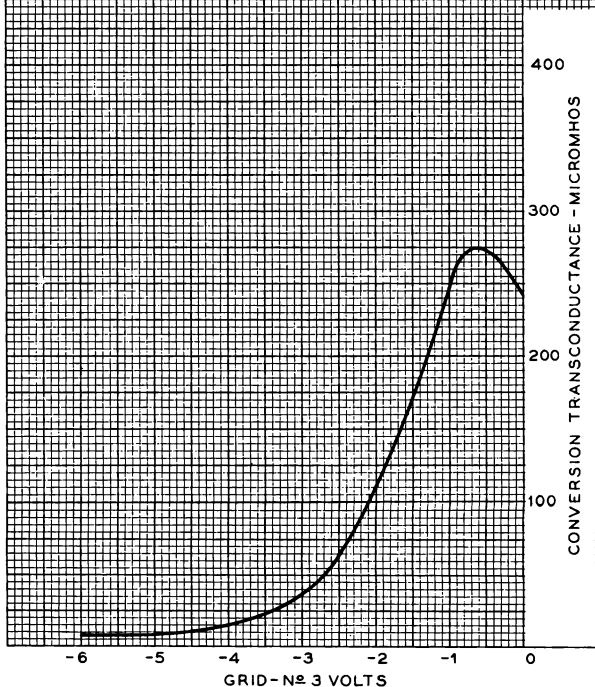
*The curves under Type 6BE6
also apply to the 26D6*



26D6

26D6 OPERATION CHARACTERISTICS WITH SEPARATE OSCILLATOR EXCITATION

$E_f = 26.5$ VOLTS
PLATE VOLTS = 26.5
GRIDS-N $\circ$ 2 & N $\circ$ 4 VOLTS = 26.5
GRID-N $\circ$ 1 MILLIAMPERES = 0.1
GRID-N $\circ$ 1 RESISTOR-OHMS = 20000



JULY 31, 1946

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

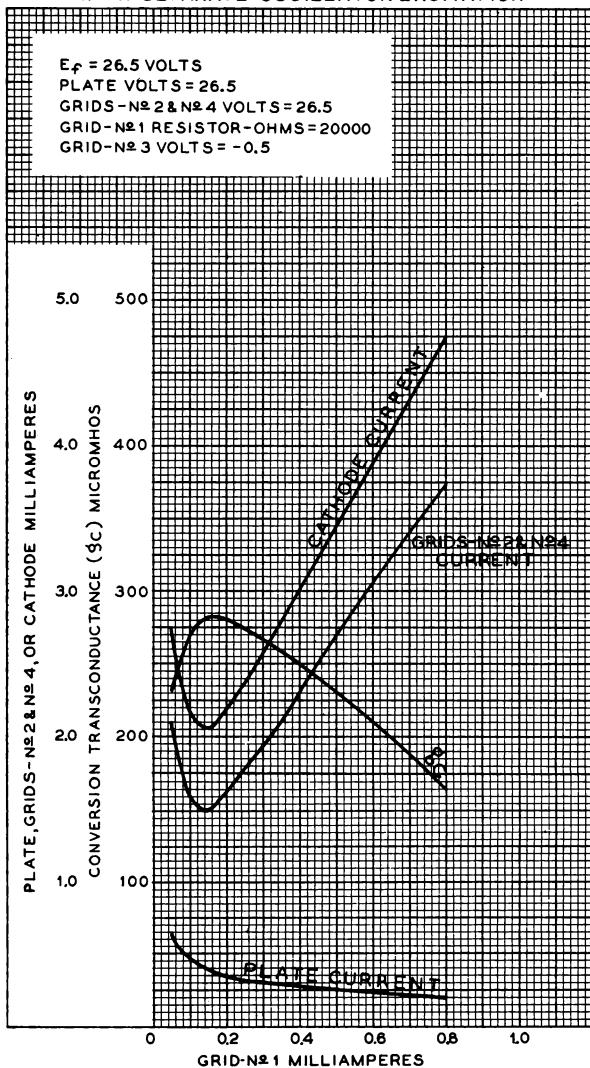
92CM-6789

26D6



26D6

OPERATION CHARACTERISTICS WITH SEPARATE OSCILLATOR EXCITATION



AUGUST 1, 1946

 TUBE DEPARTMENT
 RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6790



579-B

579-B

HALF-WAVE HIGH-VACUUM RECTIFIER

DATA**Electrical:****Filament, Thoriated Tungsten:**

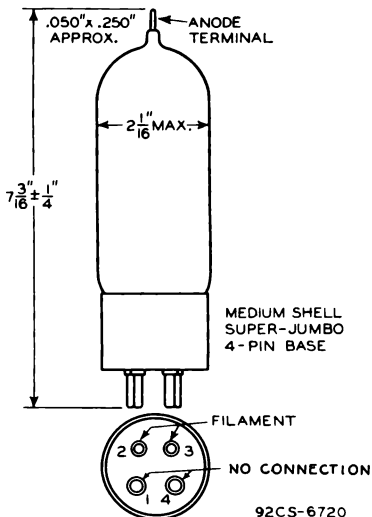
Voltage	2.5 $\pm$ 5%	volts
Current	6	amp

Mechanical:

Mounting Position	Vertical
Overall Length	7-3/16" $\pm$ 1/4"
Maximum Diameter	2-1/16"
Bulb	T-16
Bulb Terminal	See Outline Drawing
Base	Medium Shell Super-Jumbo 4-Pin

Maximum Ratings, Absolute Values:

PEAK INVERSE ANODE VOLTAGE	20000 max.	volts
PEAK ANODE CURRENT	270 max.	ma.
AVERAGE ANODE CURRENT	25 max.	ma.
AMBIENT AIR TEMPERATURE	50 max.	$^{\circ}$ C
BULB TEMPERATURE	75 max.	$^{\circ}$ C



MAY 1, 1946

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

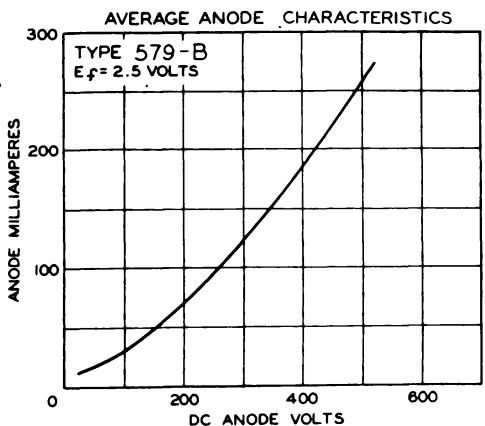
TENTATIVE DATA

579-B



579-B

HALF-WAVE HIGH-VACUUM RECTIFIER



92CS-6719

MAY 1, 1946

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-6719



864

AMPLIFIER LOW MICROPHONIC DESIGN

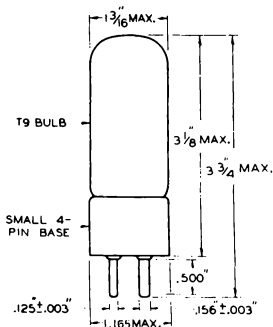
Filament	Coated	
Voltage	1.1	d-c volts
Current	0.25	amp.
Direct Interelectrode Capacitances:		
Grid to Plate	5.3	μmf
Grid to Filament	3.3	μmf
Plate to Filament	2.1	μmf
Maximum Overall Length		3-3/4"
Maximum Diameter		1-3/16"
Bulb		T-9
Base		Small 4-Pin

AMPLIFIER - Class A

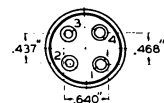
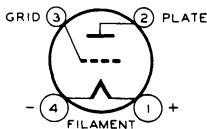
Operating Conditions and Characteristics:

Filament Voltage	1.1	1.1	d-c volts
Plate Voltage	90	135 max.	volts
Grid Voltage	-4.5	-9	volts
Amplification Factor	8.2	8.2	
Plate Resistance	13500	12700	ohms
Mutual Conductance	610	645	μmhos
Plate Current	2.9	3.5	ma.

If a grid-coupling resistor is used, its maximum value should not exceed 2.0 megohms.



TUBE SYMBOL & TOP VIEW
OF
SOCKET CONNECTIONS



BOTTOM VIEW OF BASE

92C-451R3

MAR. 20, 1936

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

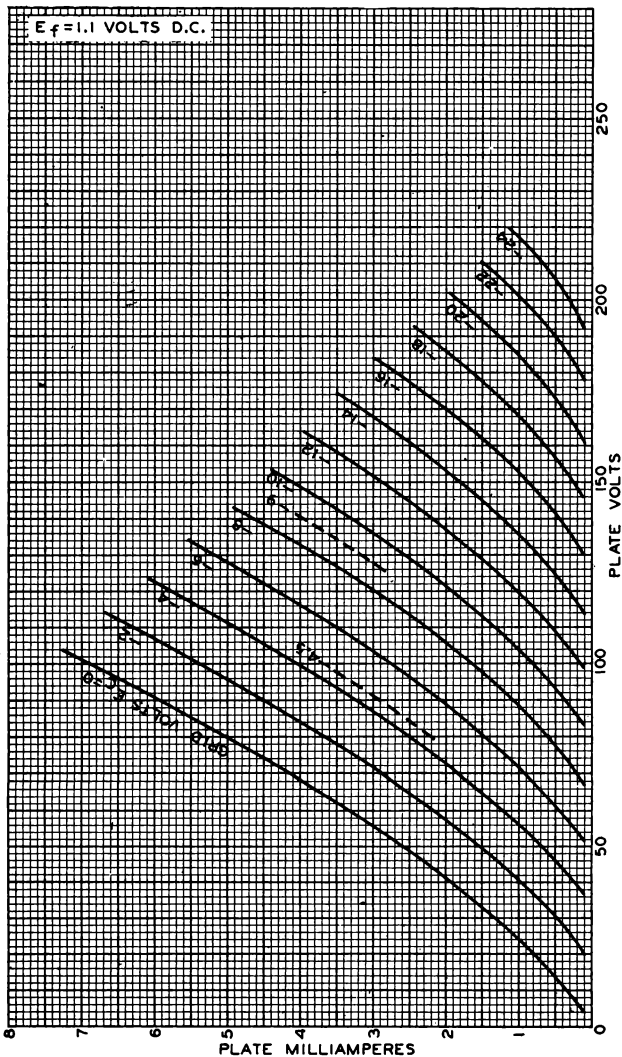
DATA

864



864

AVERAGE PLATE CHARACTERISTICS



OCT. 18, 1932

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

925-5201



874

874

VOLTAGE REGULATOR

GLOW DISCHARGE

Cathode	Cold	
Maximum Overall Length		5-3/8" ←
Maximum Seated Height		4-3/4" ←
Maximum Diameter		2-1/16" ←
Bulb,		ST-16 ←
Base		Medium 4-Pin Bayonet
Pin 1 - Cathode		Pin 3 - Anode
Pin 2 - Jumper		Pin 4 - Jumper
Mounting Position		Any



BOTTOM VIEW (4S)

*Maximum and Minimum Ratings Are Absolute Values*REGULATOR SERVICE

D-C Anode Supply Voltage*	130 min. volts	←
	{ 50 max. ma.	
D-C Operating Current (Continuous)	{ 10 min. ma.	←
Ambient Temperature Range	-55 to +90 °C	←
Characteristics:		
D-C Starting Voltage (Approx.)	115 volts	
D-C Operating Voltage (Approx.)	90 volts	
D-C Operating Current (Continuous)	10 to 50 ma.	
Regulation (10 to 50 ma.)	7 volts	

- With suitable socket connections; jumper within base acts as switch to open power-supply circuit when voltage regulator tube is removed from socket.

- * Not less than indicated supply voltages should be provided to insure "starting" throughout tube life.

Sufficient resistance must always be used in series with this type to limit the current through the tube to 50 milliamperes under continuous (steady state) operating conditions. During the interval of 5 to 10 seconds which may be required for the regulated tubes in associated equipment to warm up and draw plate current, a maximum current of 100 milliamperes is permissible provided each such starting period is followed by a steady-state operating period of at least several minutes. Unless this precaution is observed, tube performance will be impaired.

In voltage-regulator tubes of the glow-discharge type, regulation is somewhat dependent on past operating conditions. For example, the regulation value of a tube operated for a protracted period at 10 milliamperes and then changed to 35 milliamperes, may be somewhat different from the value that will be obtained after a long period of operation at 50 milliamperes. Likewise, the regulation value may change somewhat after a long idle period.

← Indicates a change.

AUG. 15, 1944

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA

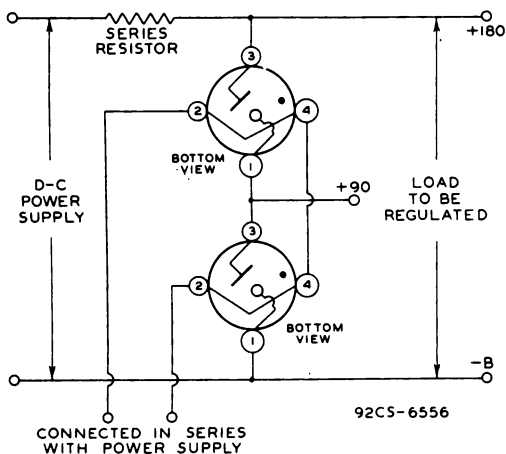
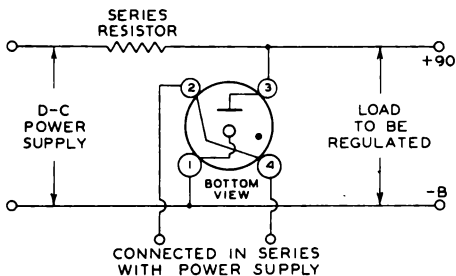
874



874

VOLTAGE REGULATOR

TYPICAL CIRCUIT CONNECTIONS





878

HALF-WAVE HIGH-VACUUM RECTIFIER

FOR USE WITH CATHODE-RAY TUBES

Filament	Tungsten	
Voltage	2.5	a-c volts
Current	5.0	amp.
Overall Length		7" to 7-5/8"
Maximum Diameter		1-13/16"
Bulb		T-14
Cap	Medium Metal Skirted	
Base	Medium 4-Pin	

Operating Conditions:

Filament Voltage	2.5	a-c volts
A-C Plate Voltage (RMS)	7100 max.	volts
Peak Inverse Voltage	20000 max.	volts
D-C Output Current (Continuous)	5 max.	ma.

The 878 is for use in suitable rectifying devices to supply the d-c voltage requirements of cathode-ray tubes.

It is important that the filament transformer secondary be insulated to withstand the maximum peak inverse voltage encountered in the installation.

The *maximum peak plate current* of the 878 is limited by the available emission from the filament. In normal operation, the peak current is practically independent of the size of input filter condenser and is approximately 20 milliamperes.

Filter requirements are ordinarily met by the use of a 0.5 to 2.0 μ f condenser shunted across the bleeder circuit. The shunt condenser should have a rating sufficient to withstand the instantaneous peak value of the a-c input voltage. If this filtering is inadequate for a definite application, a two-section filter is recommended.

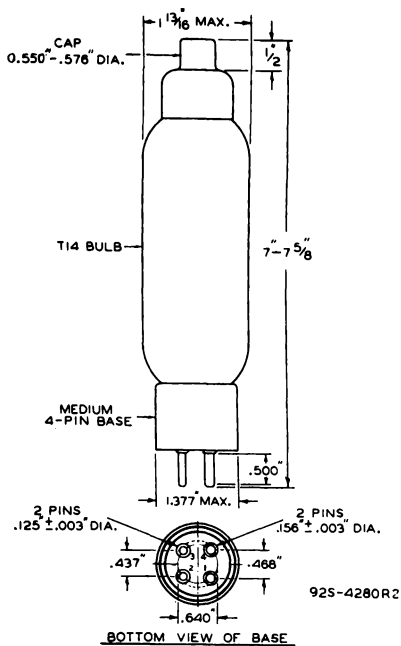
In a *voltage-doubler circuit*, two 878's may be operated to deliver approximately twice the voltage obtainable from a half-wave rectifier circuit for the same a-c input voltage. However, a separate filament-supply winding is required for each tube.

878

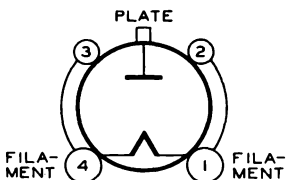


878

HALF-WAVE HIGH-VACUUM RECTIFIER



TUBE SYMBOL & TOP VIEW
OF
SOCKET CONNECTIONS



JAN. 15, 1936

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

DATA



954

DETECTOR AMPLIFIER PENTODE**ACORN TYPE***Especially for wavelengths as short as 0.7 meter*

Heater	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.15	amp.
Direct Interelectrode Capacitances:		
Grid to Plate	0.007 max.	μf
Input	3.4	μf
Output	3.0	μf
Overall Length		1-11/16" $\pm$ 3/16"
Overall Diameter		1-3/32" $\pm$ 1/16"
Bulb		T-4 $\frac{1}{2}$
End Terminals	See Outline in GENERAL SECTION	Two
Base		Small Radial 5-Pin
Pin 1-Heater		Pin 5-Cathode
Pin 2-Grid No.2		P-Plate
Pin 3-Grid No.3		G ₁ -Grid No.1
Pin 4-Heater		
RCA Socket		Stock No.9925
RCA Grid & Plate Clips		Stock No.9939
Mounting Position		Any



P is on Long Part of Bulb: Top
G₁ is on Short Part of Bulb: Bottom

BOTTOM VIEW (5BB)*Maximum and Minimum Ratings Are Design-Center Values***A-F AMPLIFIER**

D-C Plate Voltage	250 max.	volts
D-C Screen (Grid No.2) Voltage	100 max.	volts
D-C Grid (No.1) Voltage	-3 min.	volts
Plate Dissipation	0.5 max.	watt
Screen Dissipation	0.1 max.	watt
D-C Heater-Cathode Potential	80 max.	volts

Characteristics— Class A₁ Amplifier:

D-C Plate Voltage	90	250	volts
Suppressor (Grid No.3) Connected to cathode at socket			
D-C Screen Voltage	90	100	volts
D-C Grid Voltage	-3	-3	volts
Plate Resistance	1.0	Greater than 1.0	megohm
Transconductance	1100	1400	μmhos
D-C Plate Current	1.2	2.0	ma.
D-C Screen Current	0.5	0.7	ma.

Typical Operation with Resistance-Coupling:

Plate-Supply Voltage	250	volts
Suppressor	Connected to cathode at socket	
D-C Screen Voltage	50	volts
D-C Grid Voltage	-2.1	volts
Load Resistance	0.25	megohm
D-C Plate Current	0.5	ma.
Second Harmonic Distortion	5	%
Voltage Output	40 to 50 RMS	volts
Voltage Gain	100 approx.	

•, ■, ○: See next page.

◀ Indicates a change.

JUNE 30, 1944

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA

DETECTOR AMPLIFIER PENTODE

(continued from preceding page)

DETECTOR

D-C Plate Voltage	250 max.	volts
D-C Screen (Grid No.2) Voltage	100 max.	volts
D-C Heater-Cathode Potential	80 max.	volts

Typical Operation—Biased Detector:

Plate-Supply Voltage ^o	250	volts
Suppressor (Grid No.3) Connected to cathode at socket		
D-C Screen Voltage	100	volts
D-C Grid (No.1) Voltage	-6 approx.	volts
Load Resistance	0.25	megohm
D-C Plate Current	Adjusted to 0.1 ma. with no input signal	
Cathode Resistor	20000 to 50000	ohms

● With shield baffle.

■ Under maximum rated conditions, the resistance in the grid circuit should not exceed 0.5 megohm with fixed bias, or 1.0 megohm with cathode bias.

o This is a plate-supply voltage value. The voltage effective at the plate will be plate-supply voltage minus the voltage drop in load caused by the plate current.

R-f grounding by means of condensers placed close to the tube terminals is required if the full capabilities of the 954 for ultra-high-frequency uses are to be obtained. It is important in the cases of the plate and control-grid circuits that separate r-f grounding returns be made to a common point in order to avoid r-f inter-action through common return circuits. It may also be advisable in some applications to supplement the action of the by-pass condensers by r-f chokes placed close to the condensers in the return or supply lead for the grid, the screen, the suppressor, the plate, and the heater.

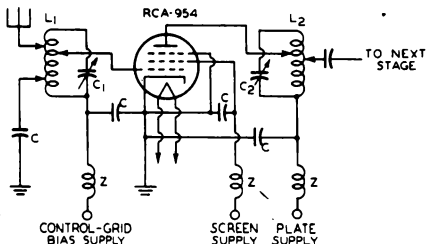
TYPICAL R-F AMPLIFIER CIRCUIT

For ultra-high frequencies, coils L1 and L2 may be tapped at suitable points determined by test to reduce effect of tube loading on circuit impedances.

Because electronic plate loading is not serious in a pentode, the use of coil L2 with tapped plate connection may not be necessary to give satisfactory results.

The condensers should all be of high quality and be designed for ultra-high frequency operation.

The license extended to the purchaser of tubes appears in the License Notice accompanying them. Information contained herein is furnished without assuming any obligations.



WAVE-LENGTH RANGE	2.75 TO 5.3 METERS APPROX.	1 TO 3 METERS APPROX.	0.8 METER APPROX.
L1, L2 { TURNS WIRE OUTSIDE DIA. LENGTH	10 №16 B.C.* 3/8" 3/4"	4 №16 B.C.* 3/8" 5/16"	5 №30 B.C.* 1/8" 1/8"
C1, C2 (VARIABLE)	3 TO 25 μ f	3 TO 25 μ f	3 TO 4 μ f
C	100 TO 500 μ f	100 TO 500 μ f	100 TO 500 μ f
Z { TURNS WIRE OUTSIDE DIA. WINDING	15 №30 1/4" S.L.□	15 №30 1/4" S.L.□	15 №30 1/4" S.L.□

*B.C.=BARE COPPER

□S.L.=SINGLE LAYER

← Indicates a change. NOTE: THE ABOVE DATA ARE NECESSARILY APPROXIMATE

92CM-4386R2

JUNE 30, 1944

RCA VICTOR DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

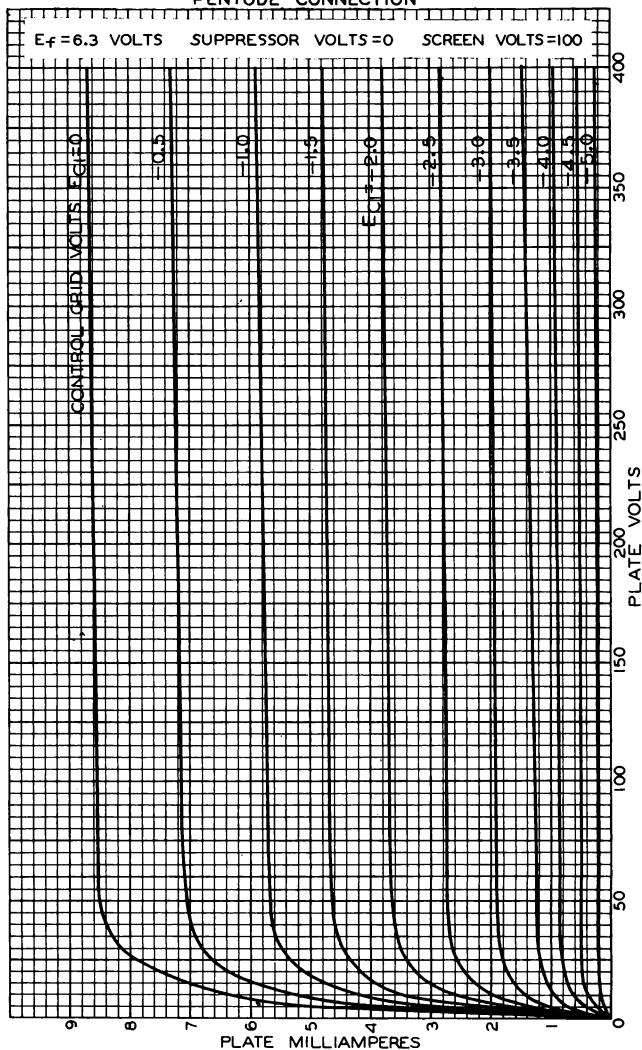
DATA



954

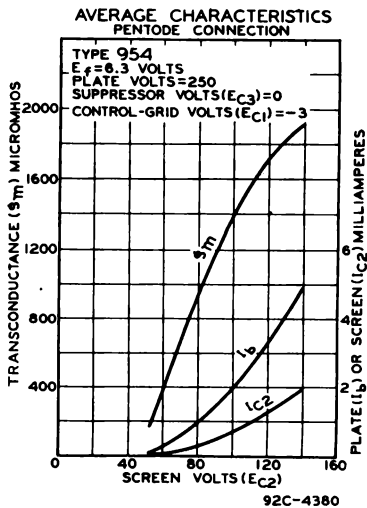
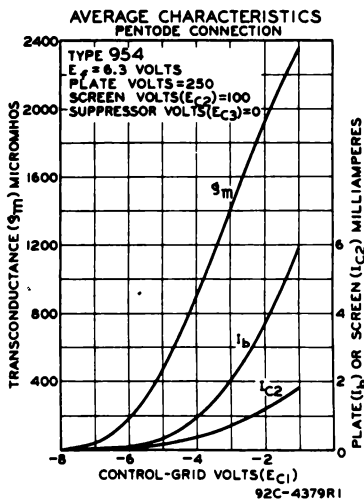
954

AVERAGE PLATE CHARACTERISTICS PENTODE CONNECTION





CHARACTERISTICS CURVES





955

955

DETECTOR, AMPLIFIER, OSCILLATOR**ACORN TYPE***Especially for wavelengths between 0.5 meter and 5 meters*

Heater	Coated Unipotential Cathode		
Voltage	6.3	a-c or d-c volts	
Current	0.15	amp.	
Direct Interelectrode Capacitances:•			
Grid to Plate	1.4	μμf	
Grid to Cathode	1.0	μμf	
Plate to Cathode	0.6	μμf	
Overall Length		1-7/32" ± 5/32"	
Overall Diameter		1-3/32" ± 1/16"	
Bulb }	See Outline in GENERAL SECTION		
Base }			
Pin 1-Heater		Small Radial 5-Pin	←
Pin 2-Plate		Pin 4-Heater	
Pin 3-Grid		Pin 5-Cathode	
RCA Socket		Stock No. 9925	
Mounting Position		Any	



Short Part of Bulb: Bottom
BOTTOM VIEW (SBC)

*Maximum Ratings Are Design-Center Values*A-F AMPLIFIER

D-C Plate Voltage		250 max.	volts	
Plate Dissipation		1.6 max.	watts	
D-C Heater-Cathode Potential		90 max.	volts	←
<i>Typical Operation and Characteristics— Class A₁ Amplifier:</i>				
D-C Plate Voltage	90	135	180	250 volts
D-C Grid Voltage*	-2.5	-3.75	-5	-7 volts
Amplification Factor	25	25	25	25
Plate Resistance	14700	13200	12500	11400 ohms
Transconductance	1700	1900	2000	2200 μmhos
D-C Plate Current	2.5	3.5	4.5	6.3 ma.
Load Resistance	—	—	20000	— ohms
Second Harmonic Dist.	—	—	5	— %
Power Output	—	—	135	— mw

Typical Operation with Resistance-Coupling:

Plate-Supply Voltage ^o	180	volts
D-C Grid Voltage*	-3.5	volts
Load Resistance	250000	ohms
Plate Current	0.42	ma.
Second Harmonic Distortion	5	%
Voltage Output	45 RMS	volts
Voltage Gain	20 approx.	

R-F POWER AMPLIFIER & OSCILLATOR — Class C*Plate Modulated or C.W.*

D-C Plate Voltage	180 max.	volts
D-C Plate Current	8 max.	ma.
D-C Grid Current	2 max.	ma.
D-C Heater-Cathode Potential	80 max.	volts
<i>Typical Operation:</i>		
D-C Plate Voltage	180	volts
D-C Grid Voltage	-35 approx.	volts
D-C Plate Current	7	ma.

•, *, ^o: See next page.

← Indicates a change.

JUNE 30, 1944

RCA VICTOR DIVISION

DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



DETECTOR, AMPLIFIER, OSCILLATOR

(continued from preceding page)

D-C Grid Current 1.5 approx.ma.
Power Output** 0.5 approx.watt

		DETECTOR	
		Biased	Grid-Leak
Typical Operation:			
Plate-Supply Voltage ^o		180	45 volts
Grid Voltage		-7 approx.	Grid Return to Cathode volts
Load Resistance		0.25	- megohm
Plate Current	Adjusted to 0.2 ma. approx. with no input signal.		- ma.
Cathode Resistor		50000 approx.	- ohms
Grid Leak		-	1 to 5 megohms
Grid Condenser		-	0.00025 μ f

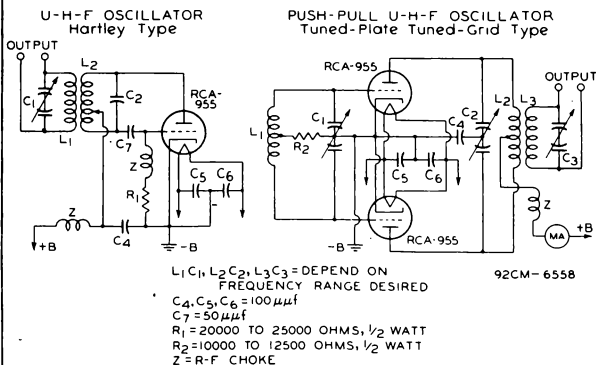
• With no external shield.

* Under maximum rated conditions, the resistance in the grid circuit should not exceed 0.1 megohm with fixed bias, or 0.5 megohm with cathode bias.

^o This is a plate-supply voltage value. The voltage effective at plate will be plate-supply voltage minus the voltage drop in load caused by plate current.

** At 5 meters. Only moderate reduction in this value will be found for wavelengths as low as 1 meter. Below 1 meter, the power output decreases as the wavelength is decreased.

R-F grounding by means of condensers placed close to the tube pins is required if the full capabilities of the 955 for ultra-high-frequency uses are to be obtained.



The license extended to the purchaser of tubes appears in the License Notice accompanying them. Information contained herein is furnished without assuming any obligations. ← Indicates a change.

JUNE 30, 1944

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RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

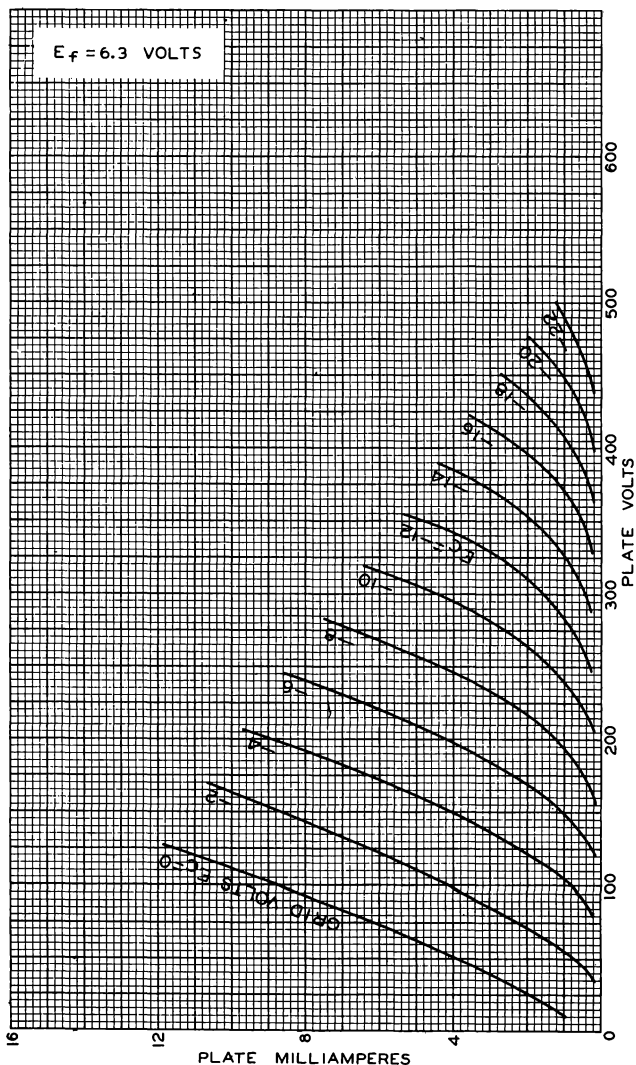
DATA



955

955.

AVERAGE PLATE CHARACTERISTICS



MAY 7, 1941

* RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

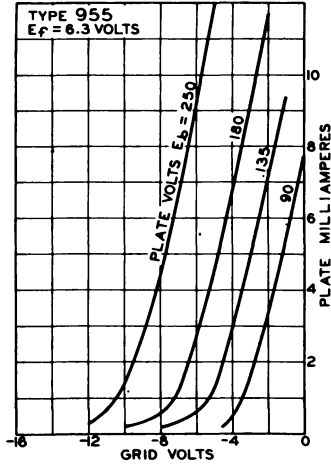
92C-5561R1

955



CHARACTERISTICS CURVES

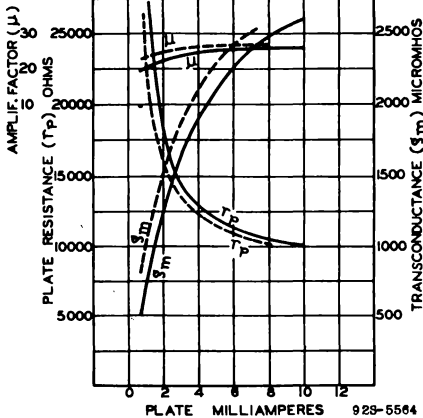
AVERAGE CHARACTERISTICS

 TYPE 955
 $E_f = 6.3$ VOLTS


92C-5563R1

AVERAGE CHARACTERISTICS

 TYPE 955
 $E_f = 6.3$ VOLTS

 CURVE PLATE VOLTS
 180
90


92S-5564

July 1, 1941

 RCA RADOTRON DIVISION
 RCA MANUFACTURING COMPANY, INC.

 92C-5563R1
 92S-5564



956

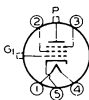
956

SUPER-CONTROL R-F AMPLIFIER PENTODE

ACORN TYPE

Especially for wavelengths as short as 0.7 meter

Heater	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.15	amp.
Direct Interelectrode Capacitances:		
Grid to Plate	0.007 max.	μf
Input	3.4	μf
Output	3.0	μf
Overall Length		1-11/16" $\pm$ 3/16"
Overall Diameter		1-3/32" $\pm$ 1/16"
Bulb		T-4 $\frac{1}{2}$
End Terminals	See Outline in GENERAL SECTION	Two
Base		Small Radial 5-Pin
Pin 1-Heater		Pin 5-Cathode
Pin 2-Grid No.2		P-Plate
Pin 3-Grid No.3		G ₁ -Grid No.1
Pin 4-Heater		
RCA Socket		Stock No.9925
RCA Grid & Plate Clips		Stock No.9939
Mounting Position		Any



P is on Long Part of Bulb: Top
G₁ is on Short Part of Bulb: Bottom

BOTTOM VIEW (5BB)

Maximum and Minimum Ratings Are Design-Center Values

AMPLIFIER

D-C Plate Voltage	250 max.	volts
D-C Screen (Grid No.2) Voltage	100 max.	volts
Grid (No.1) Voltage	-3 min.	volts
Plate Dissipation	1.7 max.	watts
Screen Dissipation	0.3 max.	watt
D-C Heater-Cathode Potential	80 max.	volts

Characteristics—Class A₁ Amplifier:

D-C Plate Voltage	250	volts
Suppressor (Grid No.3) Connected to cathode at socket		
D-C Screen Voltage	100	volts
D-C Grid (No.1) Voltage*	-3	volts
Plate Resistance	0.7 approx.	megohm
Transconductance	1800	μmhos
Grid Bias for		
Transcond. of approx. 2 μmhos	-45	volts
D-C Plate Current	6.7	ma.
D-C Screen Current	2.7	ma.

MIXER—In Superheterodyne Circuit

D-C Plate Voltage	250 max.	volts
D-C Screen Voltage	100 max.	volts
D-C Heater-Cathode Potential	80 max.	volts

Typical Operation:

D-C Plate Voltage	100	250	volts
Suppressor	Connected to cathode at socket		
D-C Screen Voltage	100	100	volts
D-C Grid Voltage	-10	-10 approx.	volts

The grid bias shown is minimum for an oscillator peak voltage of 9 volts. These values are optimum.

•, * : See next page.

← Indicates a change.

JUNE 30, 1944

RCA VICTOR DIVISION

DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



SUPER-CONTROL R-F AMPLIFIER PENTODE

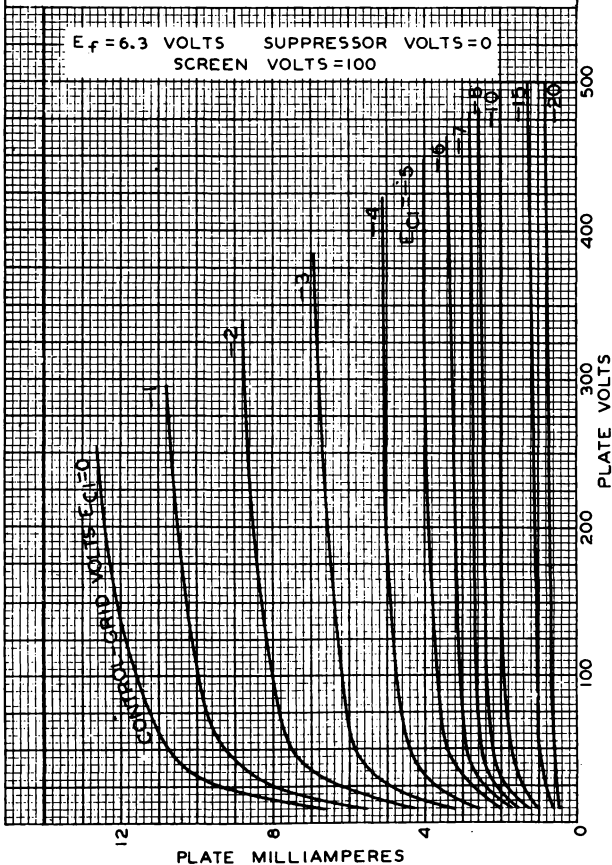
(continued from preceding page)

• With shield baffle.

* Under maximum rated conditions, the resistance in the grid circuit should not exceed 0.5 megohm with fixed bias, or 1.0 megohm with cathode bias.

*Typical R-F Amplifier Circuit for the 956
is the same as that for Type 954.*

AVERAGE PLATE CHARACTERISTICS

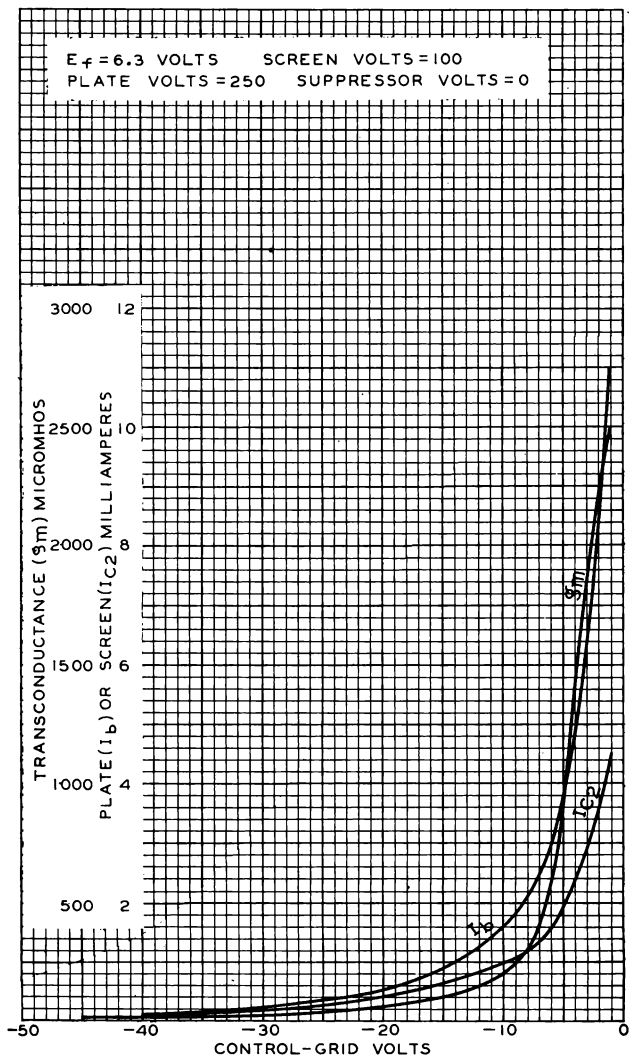




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956

AVERAGE CHARACTERISTICS



MAY 13, 1941

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

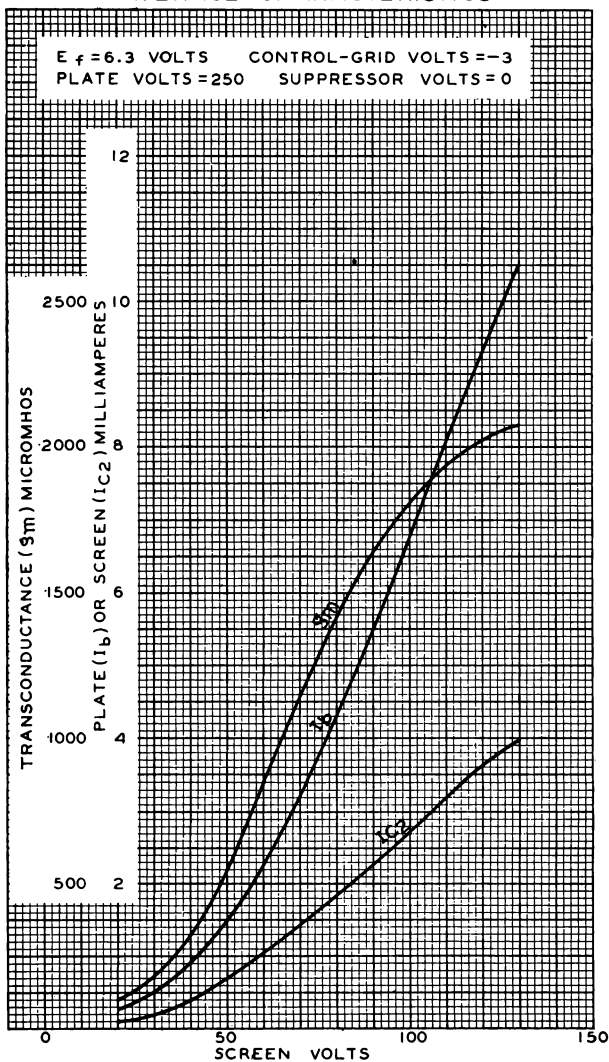
92C-4672R1

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AVERAGE CHARACTERISTICS



MAY 13, 1941

 RCA RADOTRON DIVISION
 RCA MANUFACTURING COMPANY, INC.

92C-4673RI

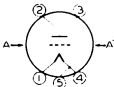


957

957

DETECTOR, AMPLIFIER, OSCILLATOR

ACORN TYPE

Filament	Coated	
Voltage	1.25	d-c volts
Current	0.05	amp.
Direct Interelectrode Capacitances: ^o		
Grid to Plate	1.2	$\mu\mu\text{f}$
Grid to Filament	0.3	$\mu\mu\text{f}$
Plate to Filament	0.7	$\mu\mu\text{f}$
Overall Length		1-7/32" $\pm$ 5/32"
Overall Diameter		1-3/32" $\pm$ 1/16"
Bulb }	See Outline in	T-4 $\frac{1}{2}$
Base }		Small Radial 5-Pin
Pin 1—Filament		Pin 5—Filament —
Pin 2—Plate		AA'—Plane of
Pin 3—Grid		Electrodes
Pin 4—Filament —		
RCA Socket		Stock No. 9925
Mounting Position		Vertical ^d

Short Part of Bulb: Bottom
BOTTOM VIEW (5BD)

Maximum Ratings Are Design-Center Values

AMPLIFIER

D-C Plate Voltage	135 max.	volts
<i>Characteristics—Class A₁ Amplifier:</i>		
D-C Plate Voltage	135	volts
D-C Grid Voltage*	-5	volts
Amplification Factor	13.5	
Plate Resistance	20800 approx.	ohms
Transconductance	650	μmhos
D-C Plate Current	2	ma.

^o With no external shield.

^d Horizontal operation permitted if plane of electrodes is vertical (plate on edge).

* Under maximum rated conditions, the resistance in the grid circuit should not exceed 0.1 megohm with fixed bias, or 0.5 megohm with cathode bias.

R-F grounding by means of condensers placed close to the tube pins is required if the full capabilities of the 957 for ultra-high-frequency uses are to be obtained.

← Indicates a change.

JUNE 30, 1944

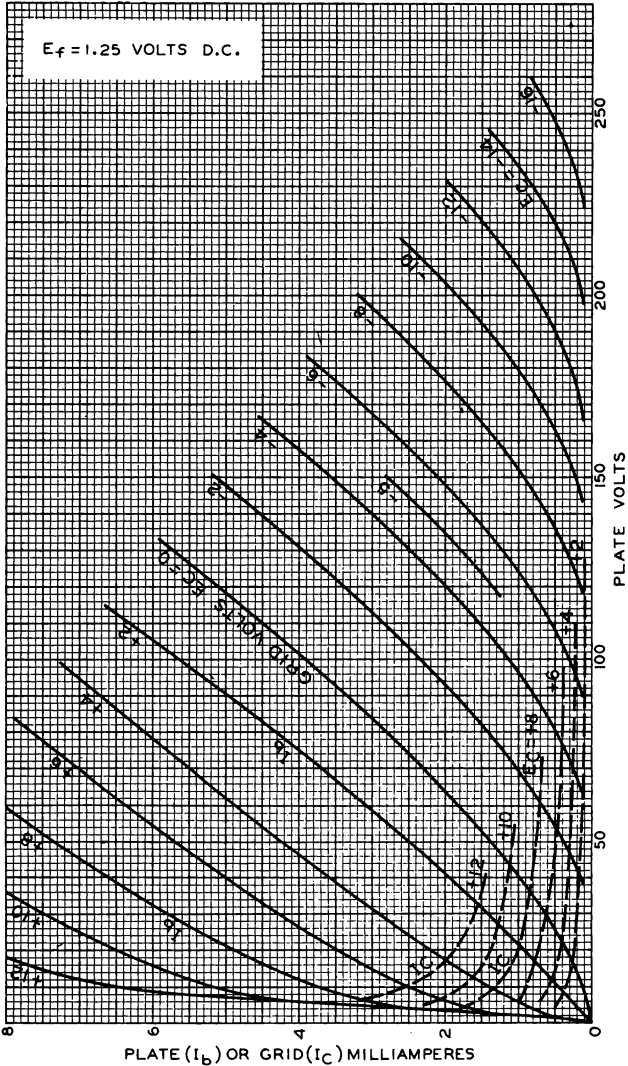
RCA VICTOR DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA



AVERAGE PLATE CHARACTERISTICS



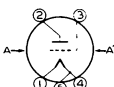


958-A

958-A

AMPLIFIER TRIODE ACORN TYPE

Filament	Coated	
Voltage	1.25	d-c volts
Current	0.10	amp.
Direct Interelectrode Capacitances: ^o		
Grid to Plate	2.6	μmf
Grid to Filament	0.6	μmf
Plate to Filament	0.8	μmf
Overall Length		1-7/32" $\pm$ 5/32"
Overall Diameter		1-3/32" $\pm$ 1/16"
Bulb }	See Outline in GENERAL SECTION	{ Small Radial 5-Pin T-4 $\frac{1}{2}$
Base }		
Pin 1—Filament +		Pin 5—Filament —
Pin 2—Plate		AA'—Plane of
Pin 3—Grid		Electrodes
Pin 4—Filament —		
RCA Socket		Stock No. 9925
Mounting Position		Vertical ^o



Short Part of Bulb: Bottom
BOTTOM VIEW (5BD)

Maximum Ratings Are Design—Center Values

A-F AMPLIFIER

D-C Plate Voltage	135 max.	volts
D-C Plate Current	5 max.	ma.
Plate Dissipation	600 max.	mw
<i>Characteristics—Class A₁ Amplifier:</i>		
D-C Plate Voltage	135	volts
D-C Grid Voltage*	-7.5	volts
Amplification Factor	12	
Plate Resistance	10000	ohms
Transconductance	1200	μmhos
D-C Plate Current	3	ma.

R-F POWER AMPLIFIER & OSCILLATOR — Class C Telegraphy

Key-down conditions per tube without modulation*

D-C Plate Voltage	135 max.	volts
D-C Grid Voltage	-30 max.	volts
D-C Plate Current	7 max.	ma.
D-C Grid Current	1 max.	ma.
D-C Plate Input	950 max.	mw
Plate Dissipation	600 max.	mw
<i>Typical Operation at Moderate Frequencies:</i>		
D-C Plate Voltage	135	volts
D-C Grid Voltage ^o	-20 20000 2500	volts ohms ohms
Peak R-F Grid Voltage	40	volts
D-C Plate Current	7	ma.
D-C Grid Current**	1 approx.	ma.
Driving Power**	35 approx.	mw
Power Output	600	mw

^o, *, $\diamond$, *, **, $\bullet$: See next page.

JUNE 30, 1944

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA

958-A



958-A

AMPLIFIER TRIODE

(continued from preceding page)

- With no external shield.
- ◇ Horizontal operation permitted if plane of electrodes is vertical (plate on edge).
- * Under maximum rated conditions, the resistance in the grid circuit should not exceed 0.1 megohm with fixed bias, or 0.5 megohm with cathode bias.
- * Modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115% of the carrier conditions.
- Obtained by a grid resistor (20000), cathode resistor (2500), or fixed supply.
- ** Subject to wide variation as explained under Tube Ratings in General Section.

NOTE: The 958-A is capable of producing a useful power output at frequencies up to approx. 350 megacycles.

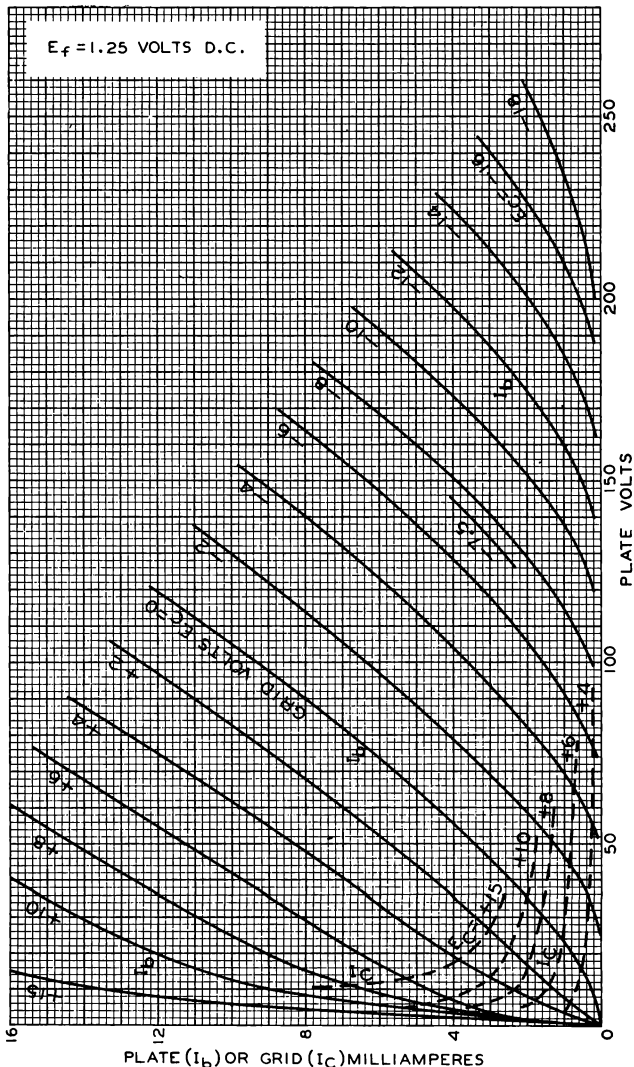
R-F grounding by means of condensers placed close to the tube pins is required if the full capabilities of the 958-A for ultra-high-frequency uses are to be obtained.



958-A

958-A

AVERAGE PLATE CHARACTERISTICS



JUNE 15, 1944

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6334 RI



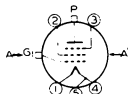
959

959

DETECTOR AMPLIFIER PENTODE

ACORN TYPE

Filament	Coated	
Voltage	1.25	d-c volts
Current	0.05	amp.
Direct Interelectrode Capacitances:		
Grid to Plate ^o	0.015 max.	μmf
Input	1.8	μmf
Output	2.5	μmf
Overall Length		1-11/16" $\pm$ 3/16"
Overall Diameter		1-3/32" $\pm$ 1/16"
Bulb		T-4 $\frac{1}{2}$
End Terminals	See Outline in GENERAL SECTION	Two
Base		Small Radial 5-Pin
Pin 1-Filament		P - Plate
Pin 2-Grid No.2		G ₁ - Grid No.1
Pin 3-Grid No.3		AA' - Plane of
Pin 4-Filament -		Electrodes
Pin 5-Filament -		
RCA Socket		Stock No. 9925
RCA Grid & Plate Clips		Stock No. 9939
Mounting Position		Vertical ^o



P is on Long Part of Bulb: Top
 G₁ is on Short Part of Bulb: Bottom
 BOTTOM VIEW (5BE)

Maximum Ratings are Design-Center Values

AMPLIFIER

D-C Plate Voltage	145 max.	volts
D-C Screen (Grid No.2) Voltage	67.5 max.	volts
Characteristics — Class A ₁ Amplifier:		
D-C Plate Voltage	135	volts
Suppressor (Grid No.3)	Connected to filament(-) at socket	
D-C Screen Voltage	67.5	volts
D-C Grid (No.1) Voltage #	-3	volts
Plate Resistance	0.8 approx.	megohm
Transconductance	500	μmhos
D-C Plate Current	1.7	ma.
D-C Screen Current	0.4	ma.

^o With shield baffle.^o Horizontal operation permitted if plane of electrodes is vertical (plate on edge).

Under maximum rated conditions, the resistance in the grid circuit should not exceed 0.1 megohm with fixed bias, or 0.5 megohm with cathode bias.

R-f grounding by means of condensers placed close to the tube terminals is required if the full capabilities of the 959 for ultra-high-frequency uses are to be obtained. It is important in the cases of the plate and control-grid circuits that separate r-f grounding returns be made to a common point in order to avoid r-f inter-action through common return circuits. It may also be advisable in some applications to supplement the action of the by-pass condensers by r-f chokes placed close to the condensers in the return or supply lead for the grid, the screen, the suppressor, the plate, and the filament.

←Indicates a change.

JUNE 30, 1944

RCA VICTOR DIVISION
 RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

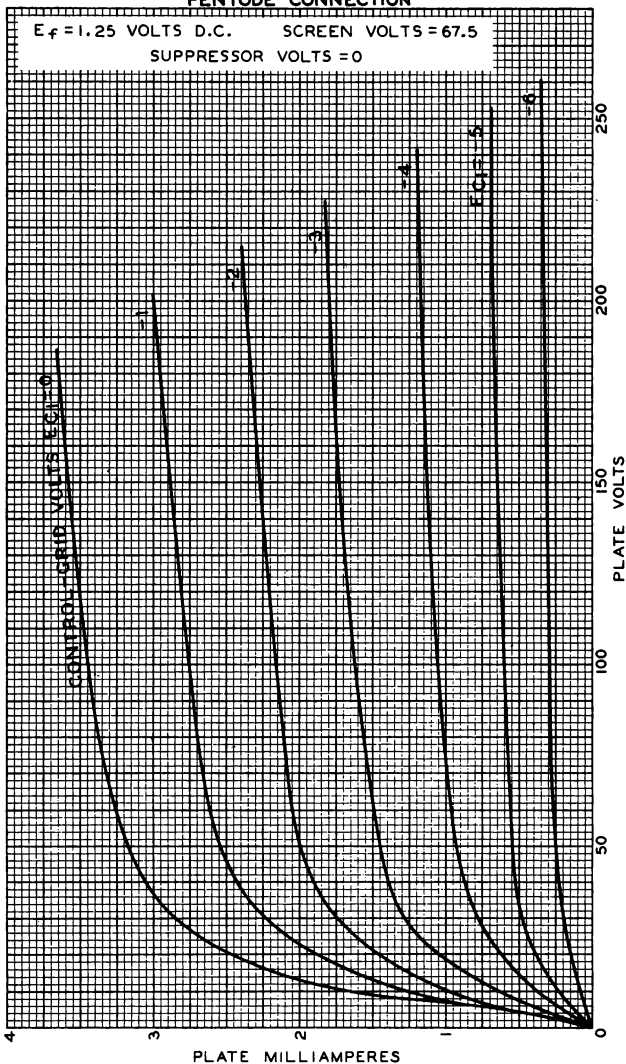
DATA

959



959

AVERAGE PLATE CHARACTERISTICS PENTODE CONNECTION



JUNE 14, 1944

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6338R1



991

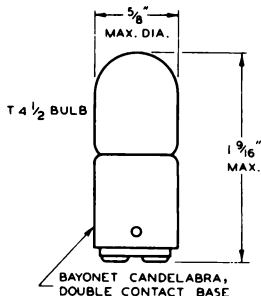
VOLTAGE REGULATOR

Type	Glow Discharge	
Maximum Overall Length		1-9/16"
Maximum Diameter		5/8"
Bulb		T-4-1/2
Base	Bayonet Candelabra, Double Contact	
Operating Conditions:		
Starting-Supply Voltage (D.C.)		87 min. volts
Peak Current *		3 max. ma.
Continuous Current (D.C.) **		2 max. ma.
Operating Voltage Δ		{ 67 max. volts 48 min. volts

* If the 991 is used with a pulsating or alternating supply voltage, the peak current should be limited to 3 ma.

** Sufficient resistance must always be used in series with this tube to limit its d-c current to 2 ma.

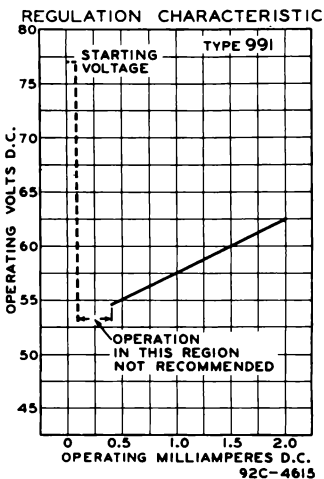
Δ For d-c operating current between 0.4 and 2 ma.



BOTTOM VIEW OF BASE

92C-4614

TUBE MOUNTING POSITION
VERTICAL OR HORIZONTAL





1603

1603

TRIPLE-GRID DETECTOR AMPLIFIER

For applications critical as to microphonics, noise, and hum

Heater	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.3	amp.
Direct Interelectrode Capacitances:▲		
Triode Connection (Approx.) - Grids #2 & #3 tied to plate		
Grid to Plate	2.0	μf
Grid to Cathode	3.0	μf
Plate to Cathode	10.5	μf
Pentode Connection		
Grid to Plate	0.007 max.°	μf
Input	4.6	μf
Output	6.5	μf
Overall Length		4-11/16" to 4-15/16"
Seated Height		4-1/16" to 4-5/16"
Maximum Diameter		1-9/16"
Bulb		ST-12
Cap		Small Metal
Base		Small 6-Pin
Pin 1 - Heater		
Pin 2 - Plate		Pin 5 - Cathode
Pin 3 - Screen		Pin 6 - Heater
Pin 4 - Suppressor		Cap - Grid
Mounting Position		



BOTTOM VIEW

SINGLE-TUBE AMPLIFIER

Plate Voltage				250 max. volts
Screen Voltage				180 max. volts
Typical Operation and Characteristics - Class A ₁ Amplifier:				
	Pentode Connection		Triode Connection	
Plate	100	250	250	180
Screen	100	100	180	-
Grid	-3	-3	-3	-5.3
Suppressor	Tied to cath. at socket			-8
Amp. Fact.	-	-	-	20*
Plate Res.	1.0	□	0.9	0.011
Transcond.	1185	1225	2000	0.0105
Grid Bias #	-7	-7	-	1800
Plate Cur.	2	2	8.3	1900
Screen Cur.	0.5	0.5	2.1	-

□ Greater than 1.5. * Approx. # Approx., for cath. cur. cut-off.

PUSH-PULL AMPLIFIER - Triode ConnectionTypical Operation - Class A₁ Amplifier:

Unless otherwise specified, values are for 2 tubes

Plate	90	volts
Grid	-2.5	volts
Cathode Resistor	625	ohms
Plate Current	4.0	ma.
Load Res. (plate to plate)	100000	ohms
Power Output	40	mw

DETECTOR

Typical Operation as Biased Detector:

Plate Supply	100	100	250	250	volts
Screen	12	30	50	100	volts
Grid	-1.16	-1.83	-1.95	-4.3	volts
Cathode Res.	18000	10000	3000	10000	ohms
Suppressor	Connected to cathode at socket				
Cath. Cur. (no sig.)	0.063	0.183	0.65	0.43	ma.
Plate Resistor	1.00	0.25	0.25	0.50	megohm
Blocking Condenser	0.01	0.01	0.03	0.03	μf
Grid Resistor *	1.00	0.50	0.25	0.25	megohm
R-F Signal (RMS)**	1.05	1.60	1.18	1.37	volts

■ In circuits where the cathode is not directly connected to the heater, the potential difference between heater and cathode should be kept as low as possible.

▲ The internal shield in the dome of the 1603 is connected to the cathode within the tube.

○ with close-fitting shield connected to cathode.

◇ Voltage at plate will be "Plate Supply" voltage minus voltage drop in plate resistor caused by plate current.

* For the following amplifier tube.

** See next page.

← Indicates a change.

1603



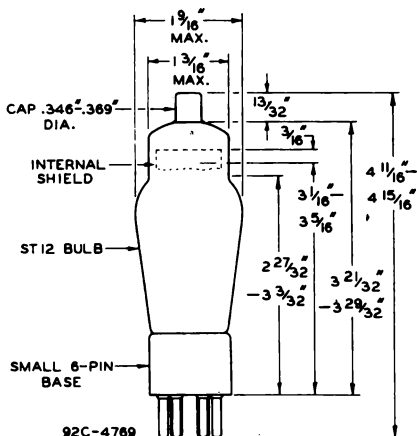
1603

TRIPLE-GRID DETECTOR AMPLIFIER

(continued from preceding page)

** With these signal values modulated 20%, the voltage output under each set of conditions is 17 peak volts at the grid of the following amplifier. This value is sufficient to insure full audio output from a 42 (for 6.3-volt operation) or a 2A5 (for 2.5-volt operation) under 250-volt plate conditions.

For Curves, refer to types 6J7 and 57. For additional Data, refer to RESISTANCE-COUPLED AMPLIFIER CHART.





1609

1609

AMPLIFIER PENTODE*For applications critical as to microphonics*

Filament	Coated	
Voltage	1.1	d-c volts
Current	0.25	amp.
Direct Interelectrode Capacitances: ^o		
Grid to Plate	1.0	μ f
Input	7	μ f
Output	7	μ f
Maximum Overall Length		4-3/16"
Maximum Seated Height		3-9/16"
Maximum Diameter		1-9/16"
Bulb		ST-12
Base		Small 5-Pin
Pin 1-Filament +		
Pin 2-Plate		Pin 4-Screen
Pin 3-Grid		Pin 5-Filament -
Mounting Position		Any

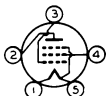
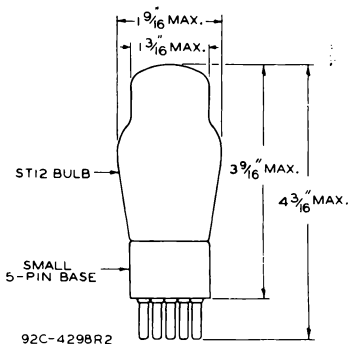
*Maximum Ratings Are Absolute Values*A-F AMPLIFIER

Plate Voltage	135 max.	volts
Screen Voltage	67.5 max.	volts
<i>Typical Operation and Characteristics - Class A₁ Amplifier:</i>		
Plate	135	volts
Screen	67.5	volts
Grid *	-1.5	volts
Plate Res.	0.4 approx.	megohm
Transcond.	725	μ hos
Plate Cur.	2.5	ma.
Screen Cur.	0.65	ma.

^o Without shield.

* The d-c resistance in the grid circuit of the 1609 should not exceed 0.5 megohm for fixed-bias conditions.



← Indicates a change.

Jan. 1, 1943

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA

1609



1609

AVERAGE PLATE CHARACTERISTICS



JAN. 26, 1937

 RCA VICTOR DIVISION
 RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

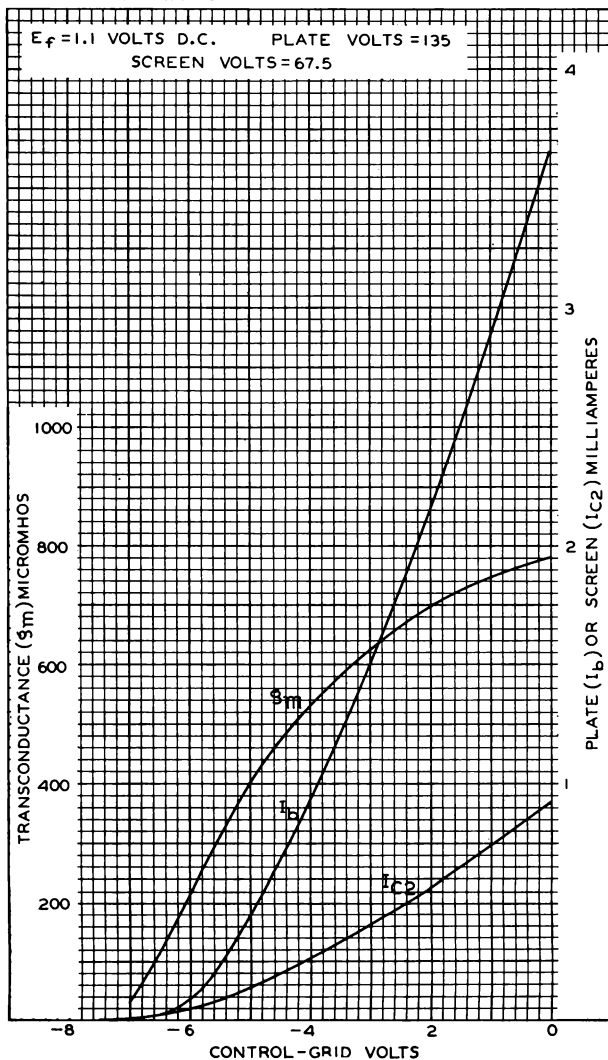
92C-4721



1609

1609

AVERAGE CHARACTERISTICS



JAN. 12, 1942

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92C-6355

1611



1611

POWER AMPLIFIER PENTODE

The 1611 is a power pentode intended for use as a relay tube in equipment on ships for automatically announcing SOS signals. To meet the special requirements of such service, the 1611 features an i_p - e_g characteristic having suitable slope and minimized variation between tubes. Physical characteristics of the 1611 are the same as those of Type 6F6.

RCA-1611 is available only through Radiomarine Corporation of America, 75 Varick Street, New York, N. Y.

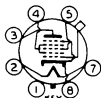


1612

1612

PENTAGRID AMPLIFIER*For applications critical as to microphonics*

Heater	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.3	amp.
Direct Interelectrode Capacitances:°		
Grid #1 to Grid #3	0.20 max.	µuf
Grid #1 to Plate	0.001 max.	µuf
Grid #3 to Plate	0.10 max.	µuf
Grid #1 to All Other Electrodes	7.5	µuf
Grid #3 to All Other Electrodes	10	µuf
Plate to All Other Electrodes	11	µuf
Maximum Overall Length		3-1/8"
Maximum Seated Height		2-9/16"
Maximum Diameter		1-5/16"
Bulb	Metal Shell, MT-8	
Cap	Miniature	
Base	Small Wafer Octal 7-Pin	
Pin 1-Shell	Pin 5-Grid #3	
Pin 2-Heater	Pin 7-Heater	
Pin 3-Plate	Pin 8-Cathode	
Pin 4-Grids #2 & #4	Cap -Grid #1	
Mounting Position	Any	



BOTTOM VIEW

*Maximum Ratings Are Design-Center Values***AMPLIFIER**

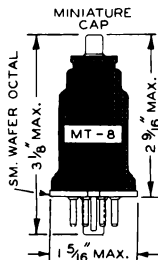
Plate Voltage	250 max.	volts
Screen Voltage	100 max.	volts
Plate Dissipation	1.5 max.	watts
Screen Dissipation	1.0 max.	watt

Typical Operation and Characteristics - Class A₁ Amplifier:

Plate	250	volts
Screen (Grids #2 & #4)	100	volts
Control Grid (Grid #1)	-3	volts
Control Grid (Grid #3)	-3	volts
Plate Res.	0.6	megohm
Transcond. (Grid #1-Plate)	1100	µmhos
Transcond. (Grid #1-Plate)*	5 approx.	µmhos
Plate Cur.	5.3	ma.
Screen Cur.	6.5	ma.

- ° In circuits where the cathode is not directly connected to the heater, the potential difference between heater and cathode should be kept as low as possible.
- * With Grid #1 bias = -15 volts; Grid #3 bias = -15 volts.

Curves under Type 8L7 also apply to the 1612.



← Indicates a change.

Jan. 1, 1943

RCA VICTOR DIVISION

DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1620



1620

TRIPLE-GRID DETECTOR AMPLIFIER

For applications critical as to microphonics

→ Heater	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.3	amp.
Direct Interelectrode Capacitances: ^o		
Pentode Connection		
Grid to Plate	0.005 max.	μuf
Input	7.0	μuf
Output	12.0	μuf
Maximum Overall Length		3-1/8"
Maximum Seated Height		2-9/16"
Maximum Diameter		1-5/16"
Bulb		Metal Shell, MT-8
Cap		Miniature
Base		Small Wafer Octal 7-Pin
Pin 1-Shell		Pin 5-Suppressor
Pin 2-Heater		Pin 7-Heater
Pin 3-Plate		Pin 8-Cathode
Pin 4-Screen		Cap -Grid
Mounting Position	BOTTOM VIEW	Any



Maximum Ratings Are Design-Center Values

AMPLIFIER - Pentode Connection

Plate Voltage	250 max. volts
Screen Voltage	100 max. volts
→ Typical Operation and Characteristics - Class A ₁ Amplifier:	
Plate	100 250 volts
Screen	100 100 volts
Grid #	-3 -3 volts
Suppressor	Connected to cathode at socket
Plate Res.	1.0 ▲ megohm
Transcond.	1185 1225 μmhos
Grid Bias for cathode current cut-off	-7 -7 volts
Plate Cur.	2.0 2.0 ma.
Screen Cur.	0.5 0.5 ma.

AMPLIFIER-Triode Connection^{oo}

→ Plate Voltage	250 max. volts
Typical Operation and Characteristics - Class A ₁ Amplifier:	
Plate	180 250 volts
Grid #	-5.3 -8 volts
Amp. Fact.	20 20
Plate Res.	11000 10500 ohms
Transcond.	1800 1900 μmhos
Plate Cur.	5.3 6.5 ma.

- For cathode-bias operation of the 1620 a minimum cathode-resistor by-pass condenser of 25 μf is recommended to minimize hum, particularly in circuits where the 1620 is followed by high-gain stages. When a 25 μf condenser or larger is used, the voltage difference between heater and cathode is not critical, but it should be kept as low as possible. If less than a 25 μf condenser is used, positive or negative biasing of the heater with respect to the cathode is required, but the bias value chosen for minimum hum should be within the range of +5 to +50 volts or -5 to -50 volts.

^o With shell connected to cathode.

[#] Under maximum rated conditions, the d-c resistance in the grid circuit should not exceed 1.0 megohm.

[▲] Greater than 1.0 megohm.

^{oo} Screen and suppressor tied to plate.

← Indicates a change.

OUTLINE DIMENSIONS for the 1620 are the same as for 1612.

Curves under Type 6J7 also apply to the 1620.

Jan. 1, 1943

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA



1621

1621

POWER AMPLIFIER PENTODE*For applications requiring continuity of service*

Heater ■ Coated Unipotential Cathode
 Voltage 6.3 a-c or d-c volts
 Current 0.7 amp.

Direct Interelectrode Capacitances (Approx.):^o

Grid to Plate 0.20 μ f
 Input 7.5 μ f
 Output 11.5 μ f

Maximum Overall Length 3-1/4"

Maximum Seated Height 2-11/16"

Maximum Diameter 1-5/16"

Bulb Metal Shell, MT-8

Base Small Wafer Octal 7-Pin

Pin 1-Shell Pin 5-Grid

Pin 2-Heater Pin 7-Heater

Pin 3-Plate Pin 8-Cathode

Pin 4-Screen

Mounting Position BOTTOM VIEW

Any

Maximum Ratings Are Design-Center ValuesPUSH-PULL AMPLIFIER - Triode Connection†*Recommended with Cathode-Bias Operation only.*

Plate Voltage 300 max. volts

Plate Dissipation 8.3 max. watts

*Typical Operation - Class A₁ Amplifier:**Unless otherwise specified, values are for 2 tubes*

Plate Supply * 327.5 volts

Cathode Resistor ▲ 500 ohms

Peak A-F Grid-to-Grid Voltage 54 volts

Zero-Sig. Plate Current 55 ma.

Max.-Sig. Plate Current 59 ma.

Load Resistance (plate-to-plate) 5000 ohms

Total Harmonic Distortion 1 %

Power Output 2 watts

* Actual voltage between cathode and plate will be plate-supply voltage minus drop in cathode resistor.

▲ Type of input coupling used should not introduce too much resistance in the grid circuit. Transformer- or impedance-coupling devices are recommended. The grid circuit may have a resistance as high as, but not greater than, 0.5 megohm provided the heater voltage is not allowed to rise more than 10% above rated value under any condition of operation.

PUSH-PULL AMPLIFIER - Pentode Connection

Plate Voltage 300 max. volts

Screen Voltage 300 max. volts

Plate Dissipation 7.9 max. watts

Screen Input 1.9 max. watts

*Typical Operation - Class A₂ Amplifier:**Unless otherwise specified, values are for 2 tubes*

Plate 300 volts

Screen 300 volts

D-C Grid Voltage # -30 volts

Peak A-F Grid-to-Grid Voltage 60 volts

Zero-Sig. Plate Current 38 ma.

Max.-Sig. Plate Current 69 ma.

■, †, #, °: See next page.

← Indicates a change.

Jan. 1, 1943

RCA VICTOR DIVISION

DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1621



1621

POWER AMPLIFIER PENTODE

(continued from preceding page)

Zero-Sig. Screen Current	5.5	ma.
Max.-Sig. Screen Current	13	ma.
Load Resistance*(plate-to-plate)	4000	ohms
Total Harmonic Distortion	3	%
Power Output	5	watts

- In circuits where the cathode is not directly connected to the heater, the potential difference between heater and cathode should be kept as low as possible.

o With shell connected to cathode.

† Screen connected to plate.

- * Type of input coupling used should not introduce too much resistance in the grid circuit. Transformer- or impedance-coupling devices are recommended. When the grid circuit has a resistance not higher than 0.05 megohm, fixed bias may be used; for higher values, cathode bias is required. With cathode bias, the grid circuit may have a resistance as high as, but not greater than, 0.5 megohm provided the heater voltage is not allowed to rise more than 10% above rated value under any conditions of operation.

OUTLINE DIMENSIONS for the 1621 are the same as those for Type 12A6.

Curves under Type 6F6 also apply to the 1621.



1622

1622

BEAM POWER AMPLIFIER*For applications requiring continuity of service*

Heater	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.9	amp.
Direct Interelectrode Capacitances (approx.): ^o		
Grid to Plate	0.4	μuf
Input	10	μuf
Output	12	μuf
Maximum Overall Length		4-5/16"
Maximum Seated Height		3-3/4"
Maximum Diameter		1-9/16" ± 1/16"
Bulb		Metal Shell, MT-10
Base		Small Wafer Octal 7-Pin
Pin 1 - Shell		Pin 5 - Grid
Pin 2 - Heater		Pin 7 - Heater
Pin 3 - Plate		Pin 8 - Cathode
Pin 4 - Screen		
Mounting Position	BOTTOM VIEW (7AC)	Any

*Maximum Ratings Are Design-Center Values*PUSH-PULL AMPLIFIER

Plate Voltage	300 max. volts
Screen Voltage	250 max. volts
Plate Dissipation	13.8 max. watts
Screen Dissipation	1.4 max. watts

*Typical Operation - Class A₁ Amplifier:**Unless otherwise specified, values are for 2 tubes*

Plate Voltage	300	volts
Screen Voltage	250	volts
D-C Grid Voltage #	-20	volts
Peak A-F Grid-to-Grid Voltage	40	volts
Zero-Sig. Plate Current	86	ma.
Max.-Sig. Plate Current	125	ma.
Zero-Sig. Screen Current	4	ma.
Max.-Sig. Screen Current	10.5	ma.
Load Resistance (plate to plate)	4000	ohms
Total Harmonic Distortion	1	%
Power Output	10	watts

■ The heater voltage should never fluctuate so that it exceeds 7 volts. The potential difference between heater and cathode should be kept as low as possible.

The type of input coupling used should not introduce too much resistance in the grid circuit. Transformer- or impedance-coupling devices are recommended. When the grid circuit has a resistance not higher than 0.1 megohm, fixed bias may be used; for higher values, cathode bias is required. With cathode bias, the grid circuit may have a resistance not to exceed 0.5 megohm, provided the heater voltage is not allowed to rise more than 10% above the rated value under any condition of operation.

o With shell connected to cathode.

Curves under Type 6L6 also apply to the 1622 within the limitations of its maximum ratings.

← Indicates a change.

AUG. 2, 1943

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA



1629

1629

ELECTRON-RAY TUBE

INDICATOR TYPE WITH TRIODE UNIT

Heater	Coated Unipotential Cathode	
Voltage	12.6	a-c or d-c volts
Current	0.15	amp.
Overall Length	3-15/16"	$\pm 3/16"$
Seated Height	2-3/8"	$\pm 3/16"$
Maximum Diameter	1-3/16"	
Bulb	T-9	
Base	Small Shell Octal 7-Pin	
Pin 1 - No Connection	Pin 5 - Grid	
Pin 2 - Heater	Pin 7 - Heater	
Pin 3 - Plate	Pin 8 - Cathode	
Pin 4 - Target		
Mounting Position		Any



BOTTOM VIEW (7AL)

*Maximum and Minimum Ratings Are Design-Center Values*INDICATOR SERVICE

Plate-Supply Voltage	250 max. volts	
Target Voltage	250 max. volts	
	125 min. volts	
D-C Heater-Cathode Potential	90 max. volts	
<i>Typical Operation:</i>		
Plate and Target Supply Voltage	200	250 volts
Series Triode Plate Resistor [□]	1	1 megohm
Target Current $\dagger \diamond$	3	4 ma.
Triode-Plate Current $\diamond$	0.19	0.24 ma.
Triode-Grid Voltage (Approx.)		
For shadow angle of 0°	-6.5	-8.0 volts
For shadow angle of 90°	0	0 volts

[□] Designated as R in the circuit diagram under Type 6E5, in the Receiving Tube Section.[†] Subject to wide variation.[◇] For triode-grid bias of 0 volts.[▲] The plane of the ray-control electrode passes through the tube axis and base key.*Curves for Type 1629 are the same as for the 6E5 in the Receiving-Tube Section.*

← Indicates a change.

JUNE 30, 1944

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

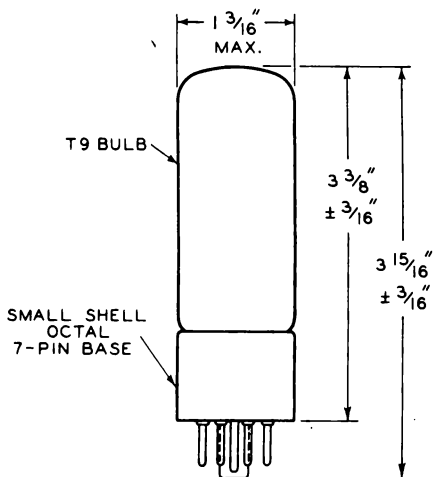
DATA

1629



1629

ELECTRON-RAY TUBE



92CM-6554

JUNE 30, 1944

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA



1631

1631
6L6
6L6**BEAM POWER AMPLIFIER***For applications critical as to uniformity of characteristics*

Heater	Coated Unipotential Cathode	
Voltage	12.6	a-c or d-c volts
Current	0.45	amp.
Plate Dissipation	16 max. watts	

Other ratings, characteristics, dimensions, and socket connections for the 1631 are the same as those for Type 6L6. Typical operating data for the 6L6 also apply to the 1631 within the limitation of the maximum plate-dissipation rating.

1632

BEAM POWER AMPLIFIER*For applications critical as to uniformity of characteristics*

Heater	Coated Unipotential Cathode	
Voltage	12.6	a-c or d-c volts
Current	0.6	amp.
Plate Voltage	117 max. volts	
Screen Voltage	117 max. volts	
Plate Dissipation	5.5 max. watts	

Dimensions and socket connections for the 1632 are the same as for Type 25L6. Typical operating data for the 1632 are the same within its plate voltage and dissipation limitations as for the 25L6.

1633

TWIN-TRIODE AMPLIFIER*For applications critical as to matching of the two triode units*

Heater	Coated Unipotential Cathode	
Voltage	25	a-c or d-c volts
Current	0.15	amp.

Direct Interelectrode Capacitances (Approx.):^o

	<u>Triode Unit T_1</u>	<u>Triode Unit T_2</u>	
Grid to Plate	3.6	3.6	μf
Grid to Cathode	3.0	2.8	μf
Plate to Cathode	0.8	1.2	μf

Maximum Overall Length 3-5/16"

Maximum Seated Height 2-3/4"

Maximum Diameter 1-5/16"

Bulb T-9

Base Intermediate Shell Octal 8-Pin

Pin 1 - Grid T_2 Pin 5 - Plate T_1 Pin 2 - Plate T_2 Pin 6 - Cathode T_1 Pin 3 - Cathode T_2 Pin 7 - HeaterPin 4 - Grid T_1 Pin 8 - Heater

Mounting Position Any



BOTTOM VIEW (8BD)

For convenience, one triode unit is identified as T_1 ; the other as T_2 .

^o See next page.

Nov. 15, 1945

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA

1633
1634



1633

TWIN-TRIODE AMPLIFIER

(continued from preceding page)

Maximum And Minimum Ratings Are Design-Center Values

AMPLIFIER - Each Unit

Plate Voltage	300 max. volts
Grid Voltage	0 min. volts
Cathode Current	20 max. ma.
Plate Dissipation	2.5 max. watts
D-C Heater-Cathode Potential	90 max. volts

Characteristics - Class A₁ Amplifier:

Plate Voltage	250	volts
Grid Voltage*	-8	volts
Amplification Factor	18	
Plate Resistance	6900	ohms
Transconductance	2600	μmhos
Plate Current	11.5	ma.

0 With no external shield.

* The d-c resistance in the grid circuit should not exceed 1.0 megohm under maximum rated conditions per unit.

Curves for Type 1633 are the same as for the 6J5, and 6SN7-GT.

1634

TWIN-TRIODE AMPLIFIER

For applications critical as to matching of the two triode units

Maximum ratings, characteristics, dimensions, and socket connections for the 1634 are the same as for Type 12SC7.



1635

1635

HIGH-MU TWIN POWER TRIODE

GENERAL DATA

Electrical:

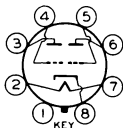
Heater, for Unipotential Cathode:

Voltage. 6.3 ac or dc volts
 Current. 0.6 amp

Mechanical:

Mounting Position. Any
 Maximum Overall Length 3-5/16"
 Maximum Seated Length 2-3/4"
 Maximum Diameter 1-5/16"
 Bulb T-9
 Base Intermediate-Shell Octal 8-Pin
 Basing Designation for BOTTOM VIEW G-8B

Pin 1-No
 Connection
 Pin 2-Heater
 Pin 3-Plate of
 Unit No.2
 Pin 4-Grid of
 Unit No.2



Pin 5-Grid of
 Unit No.1
 Pin 6-Plate of
 Unit No.1
 Pin 7-Heater
 Pin 8-Cathode

AF POWER AMPLIFIER—Class B

Maximum Ratings, Design-Center Values:

DC PLATE VOLTAGE 300 max. volts
 PEAK PLATE CURRENT (per plate) 90 max. ma.
 PLATE DISSIPATION (per plate) 3 max. watts
 PEAK HEATER-CATHODE VOLTAGE:
 Heater negative with respect to cathode 90 max. volts
 Heater positive with respect to cathode 90 max. volts

Typical Operation:

Values are for 2 units unless otherwise specified

DC Plate Voltage 300 300 volts
 DC Grid Voltage. 0 0 volts
 Peak AF Grid-to-Grid Voltage 70 108* volts
 Zero-Signal DC Plate Current 6.6 6.6 ma.
 Max.-Signal DC Plate Current 54 54 ma.
 Peak Grid Current (per unit) 38 39 ma.
 Plate-Supply Impedance 0 1000* ohms
 Effective Load Resistance
 (plate-to-plate) 12000 12000 ohms
 Effective Grid-Circuit Impedance
 (per unit) 0 516** ohms
 Total Harmonic Distortion 4 5 %
 Max.-Signal Power Output 10.4 10.4 watts

●, *, **: See next page.

← Indicates a change.

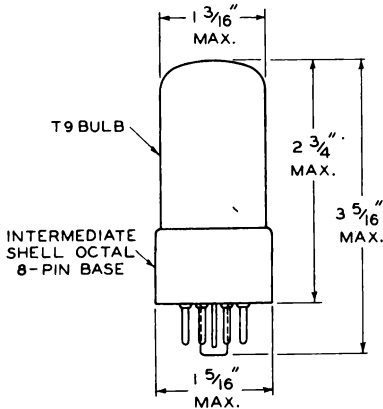
1635



1635

HIGH-MU TWIN POWER TRIODE

- Includes peak voltage drop through the grid-circuit impedance.
- * Practical design value.
- ** At 400 cycles for class B stage in which the effective resistance per grid circuit is 500 ohms, and the leakage reactance of the coupling transformer is 50 millihenrys. The driver stage should be capable of supplying the grids of the class B stage with the specified values at low distortion.

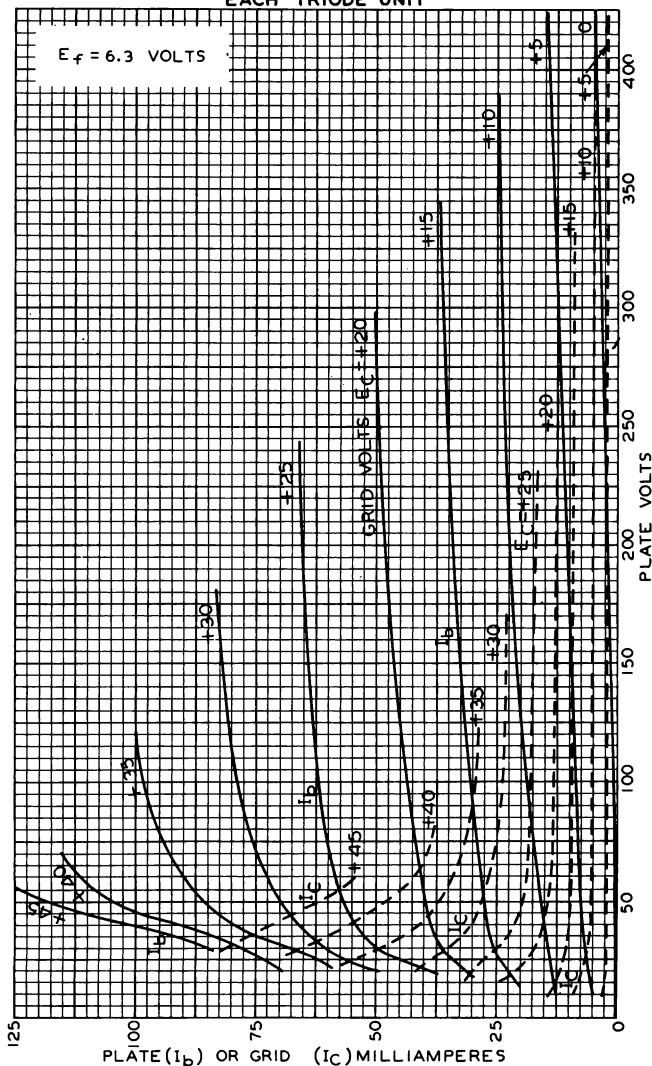


92C-6393



1635

1635

AVERAGE PLATE CHARACTERISTICS
EACH TRIODE UNIT

FEB. 26, 1942

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

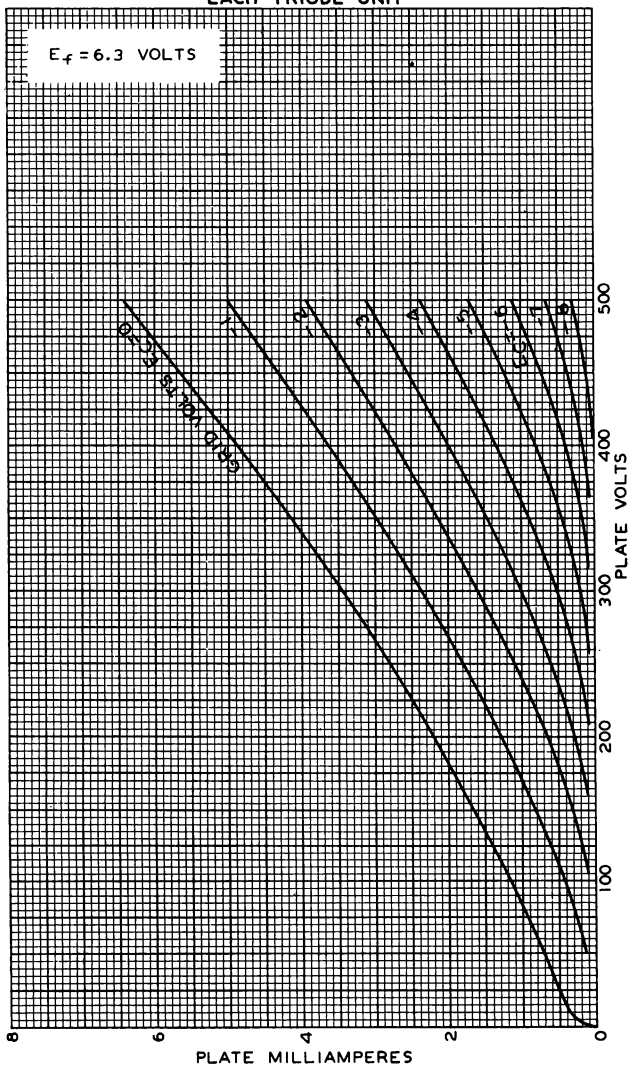
92C-6358

1635



1635

AVERAGE PLATE CHARACTERISTICS EACH TRIODE UNIT



FEB. 27, 1942

RCA RADIONRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6369



1654

1654

HALF-WAVE VACUUM RECTIFIER

MINIATURE TYPE

GENERAL DATA**Electrical:**

Filament, Coated:

Voltage. 1.4 ac or dc volts

Current. 0.05 amp

Direct Interelectrode Capacitance (Approx.):⁰Plate to Filament. 1.4 μf ⁰ With no external shield.**Mechanical:**

Mounting Position. Any

Maximum Overall Length. 2-7/16"

Maximum Seated Length. 2-3/16"

Maximum Diameter. 3/4"

Bulb T-5-1/2

Base Small-Button Miniature 7-Pin

Basing Designation for BOTTOM VIEW. 2Z

Pin 1-Filament -

Pin 2-Internal Con.

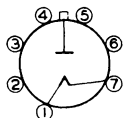
Do Not Use

Pin 3-Internal Con.

Do Not Use

Pin 4-No Connection

Pin 5-No Connection



Pin 6-Internal Con.

Do Not Use

Pin 7-Filament +

Bulb

Ter-

minal

} Plate

HALF-WAVE RECTIFIER**Maximum Ratings, Design-Center Values:***

PEAK INVERSE PLATE VOLTAGE 4300 max. volts ←

PEAK PLATE CURRENT[†]. 6 max. ma

AVERAGE PLATE CURRENT 1 max. ma

Typical Operation:

AC Plate-Supply Voltage. 1500 . . . volts ←

Filter-Input Capacitor 0.025 . . . μf

Total Effective Plate-Supply Impedance . . . 150000 . . . ohms ←

DC Output Current. 1 . . . ma

DC Output Voltage (At Input to Filter)[‡]. . . 1230 . . . volts ←**Circuit Values:**

A plate-supply impedance of 150000 ohms is required in order that the "hot-switching" current will not exceed the permissible value of 15 ma. under conditions of normal line-voltage fluctuation. For plate-supply voltages lower than 1500 volts, the plate-supply impedance may be decreased provided the resultant peak-current rating of 6 ma. and the "hot-switching" current of 15 ma. are not exceeded.

* , † , ‡: See next page.

← Indicates a change.

MAR. 15, 1948

TUBE DEPARTMENT

DATA

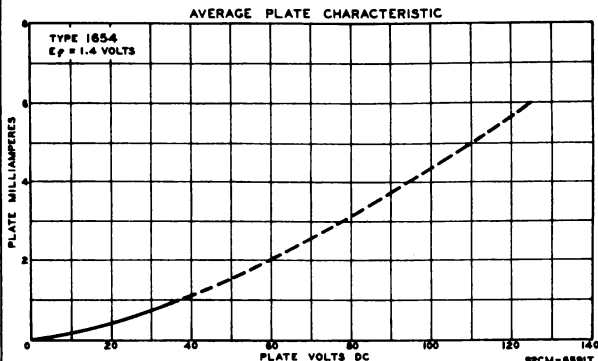
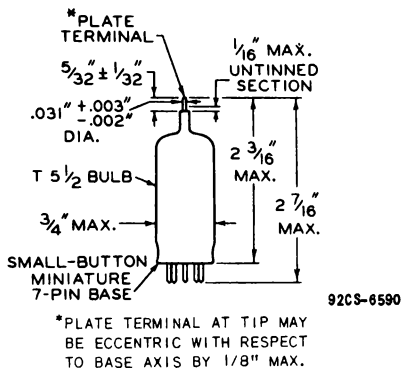
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1654



1654 HALF-WAVE VACUUM RECTIFIER

- These ratings apply to the 1654 when it is operated from a power supply having a frequency up to 500 cycles per second. If a contemplated application involves higher supply frequencies, please write, stating the proposed operating frequency, to Commercial Engineering, RCA, Harrison, N. J., as to the required reduction in ratings.
- • A peak value of 15 ma. for 0.1 second is permitted under conditions of "hot-switching", i.e., switching the plate circuit "on" while the filament is hot.
- Values are approximate. → Indicates a change.



MAR. 15, 1948

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA



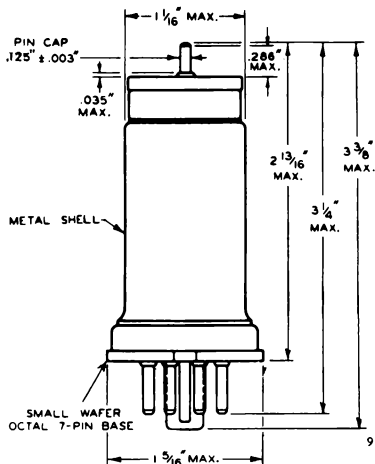
1851

1851

TELEVISION AMPLIFIER PENTODE

Heater ★	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.45	amp.
Direct Interelectrode Capacitances: °		
Grid to Plate	0.02 max.	μf
Input	11.5	μf
Output	5.2	μf
Maximum Overall Length		3-3/8"
Maximum Diameter		1-5/16"
Bulb		Metal Shell, MT-8
Cap		Pin Cap
Base		Small Wafer Octal 7-Pin
° With shell connected to cathode.		

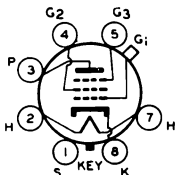
For additional data and curves, refer to Type 1852. The 1851 and 1852 are identical electrically except for capacitances.



92C-4870R1

BOTTOM VIEW OF
SOCKET CONNECTIONS

G₁ = GRID
G₂ = SCREEN
G₃ = SUPPRESSOR
H = HEATER
K = CATHODE
P = PLATE
S = SHELL



MOUNTING POSITION

VERTICAL: Base up
or down.
HORIZONTAL: Per-
missible with Pins
#2 & #7 in vertical
plane.

JULY 1, 1938

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

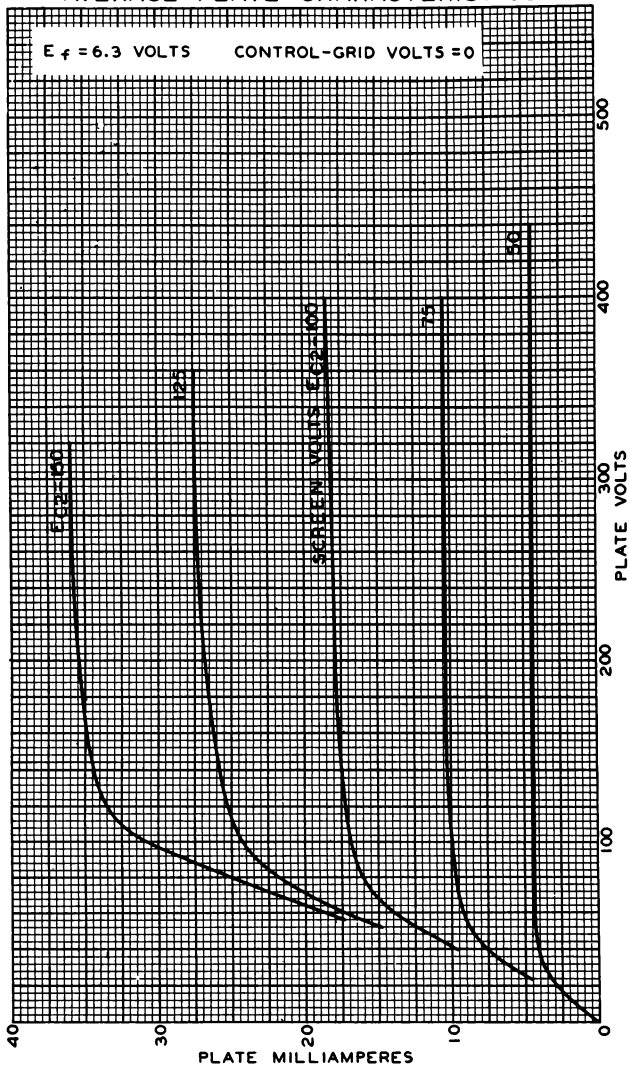
TENTATIVE DATA

1851



1851

AVERAGE PLATE CHARACTERISTICS



FEB. 14, 1938

RCA RADIODIVISION
RCA MANUFACTURING COMPANY, INC.

92C-4877



1945

1945

VACUUM-GAUGE TUBE

HYDROGEN-SENSITIVE, IONIZATION TYPE

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathode:

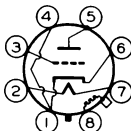
Voltage. $6.3 \pm 10\%$. . . ac or dc volts
 Current. 0.75 amp

Mechanical:

Mounting Position. Any
 Maximum Overall Length 6-3/8"
 Maximum Diameter 1-5/16"
 Tubulation See Outline Drawing
 Bulb Metal Shell MTBG
 Base Small-Wafer Octal 8-Pin

BOTTOM VIEW

Pin 1 - Cathode
 Pin 2 - Heater
 Pin 3 - Ion
 Collector
 Pin 4 - Cathode
 Pin 5 - Plate, Shell
 DO NOT USE
 FOR GETTER
 CONNECTION



Pin 6 - Cathode
 Pin 7 - Heater
 Pin 8 - Getter
 Shell - Plate, Getter
 Connection
 to Hexagonal
 Section of
 Tubulation

LEAK DETECTOR**Maximum Ratings, Absolute Values:**

PLATE VOLTAGE.	300 max. volts
ION-COLLECTOR VOLTAGE	{ -30 max. volts
	-15 min. volts
PLATE CURRENT.	50 max. ma.
PLATE DISSIPATION.	7 max. watts
PEAK HEATER-CATHODE VOLTAGE.	0 max. volts

Typical Operation:

Plate Voltage.	185 . . volts
Minimum Plate-Supply Voltage	250 . . volts
Ion-Collector Voltage.	-22.5 . . volts
Plate Current.	32 . . ma.
Ion-Collector Current.	Less than 0.5* μ amp
Plate Dissipation.	6 . . watts

* With no hydrogen in the gauge. When hydrogen from minute leaks enters the gauge tube, the ion-collector current may increase by less than 1%. In order to obtain a definite reading of such small changes in ion-collector current, it is necessary to use an amplifier capable of amplifying dc currents of the order of 0.005 μ amp.

The metal shell of the 1945 contains an indirectly-heated cathode, an ion-collector and a plate made of palladium. The palladium plate located across the inner end of the tubulation serves, when cold, as a vacuum-tight barrier to the vacuum system. This construction permits the metal enclosure to be exhausted to a much better vacuum than

JUNE 20, 1947

TUBE DEPARTMENT
 RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA

1945



1945

VACUUM-GAUGE TUBE

(continued from preceding page)

normally exists in a vacuum system. However, when heated, the palladium plate serves as a permeable membrane which permits any hydrogen in the vacuum system to which the 1945 is connected to flow into the tube.

Practical application of the 1945 to locating a leak consists simply of connecting it to the vacuum system and of probing the system with a jet of gas containing a high percentage of hydrogen. If a leak is present, hydrogen enters the vacuum system at the point of leakage, passes through the hot palladium plate, and produces an increase in current to the ion-collector.

Because of its high vacuum, the 1945 can detect far smaller leaks than are detectable using conventional ionization gauges operating at the same pressure as the vacuum system. Actually, an increase in hydrogen pressure of less than 10^{-7} mm of mercury (10^{-4} microns) can be detected by the 1945.

The 1945 can be connected to a hard-glass, soft-glass, or metal vacuum system.

Connection to a hard-glass system may readily be made by breaking off the tip of the glass tubulation (see Outline Drawing), and sealing the (Corning Code 772 Nonex) tubulation to the glass system.

Connection to a soft-glass system requires a graded seal between the hard-glass tubulation of the 1945 and the soft glass of the system.

Connection to a metal system requires that the glass tubulation first be removed by pinching the glass with pliers at a point close to the Kovar seal. Then, the 1945 can be connected to a metal system by a straight pipe coupling which is necessary for clearance of the metal exhaust tubulation. Always apply the wrench to the hexagonal section and never to the metal shell. After the coupling has been tightened, it should be coated with Glyptal to insure that the joint is vacuum tight.

Suitable support should be provided for the 1945. In a glass system, it should be supported by a suitable clamp encircling the metal shell. The clamp should be lined with an asbestos pad so that the clamp does not place a strain on the welds. In a metal system, the 1945 can usually be supported by the pipe coupling.

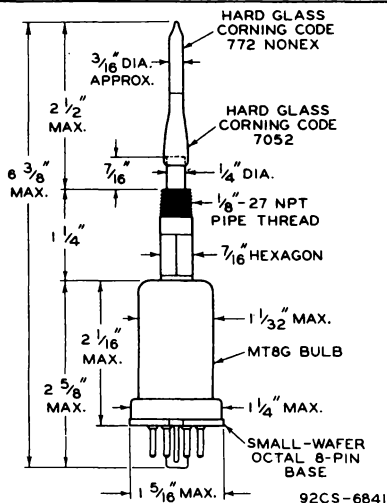
For safety reasons, it is advisable to have the metal shell of the 1945 at ground potential (positive polarity).



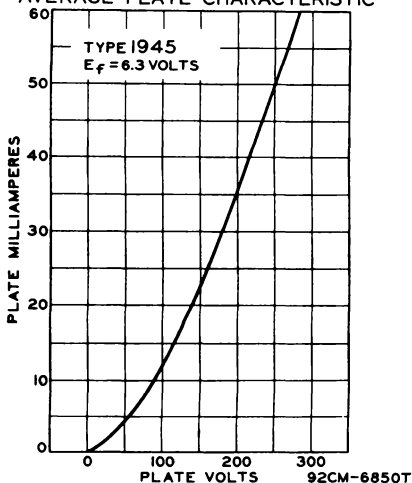
1945

1945

VACUUM-GAUGE TUBE



AVERAGE PLATE CHARACTERISTIC



JUNE 20, 1947

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-6841-6850T



1946

1946 VACUUM-GAUGE TUBE

THERMOCOUPLE TYPE

DATA**General:**

Heater, for Thermocouple:

Voltage (Approx.). 1 ac or dc volts
 Current. 0.070 amp
 Resistance of Thermocouple 5 approx. ohms
 Maximum Overall Length (with tubulation) 6-1/4"
 Maximum Diameter 1-11/16"
 Bulb T-12
 Tubulation 3/8" Diameter Hard Glass,

Corning Code 772 Nonex

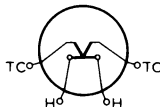
Mounting Position. Any

Terminal Arrangement See Outline Drawing

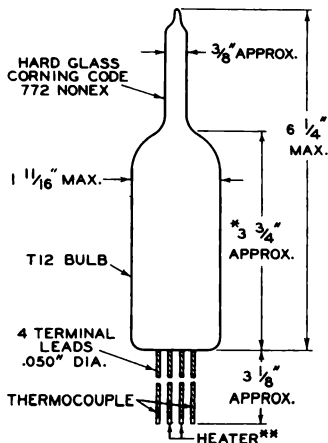
Terminal Connections:

H - Heater

TC - Thermocouple

**Calibration:**

See next page.



* MEASURED FROM BULB END TO BULB-TOP LINE AS DETERMINED BY RING GAUGE OF 1/2" I.D.

** BROWN HEATER LEAD SHOULD BE CONNECTED TO POSITIVE TERMINAL OF DC HEATER SUPPLY. 92CS-6815

JUNE 20, 1947

TUBE DEPARTMENT
 RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA

1946

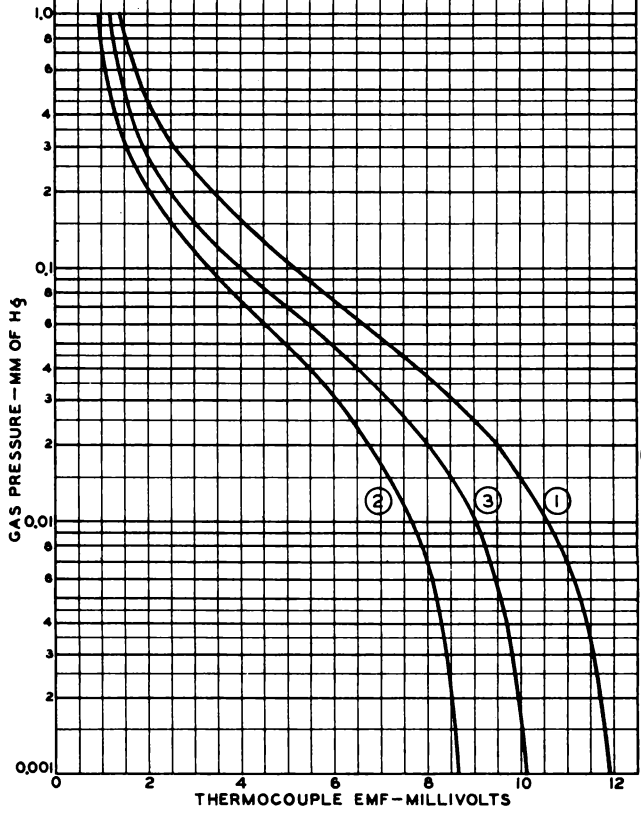
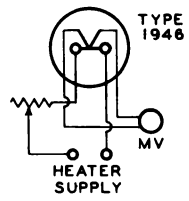


1946

CALIBRATION CURVES

CURVE	HEATER		CURRENT AMP
	BROWN LEAD	UNMARKED LEAD	
1	+	-	0.070 DC
2	-	+	0.070 DC
3	±	±	0.070 RMS

GAS = DRY AIR
TO CONVERT MM TO MICRONS,
MULTIPLY VALUES BY 1000



MAR. 11, 1947

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6852



1947

1947 VACUUM-GAUGE TUBE

PIRANI TYPE

DATA**General:**

Filament, Platinum Iridium:

Voltage (Approx.) 10 dc volts

Current (Varies with
Gas Pressure). 70-100 ma.Resistance between base
pins No.1 & No.2 un-
der vacuum better than
 3×10^{-5} mm of mercury 135.8 ohms

Maximum Overall Length (including tubulation). 7-9/16"

Maximum Diameter 1-3/16"

Bulb T-9

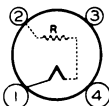
Tubulation 7/32" Diameter Soft Glass,
Corning Code 001 Lead

Mounting Position. Any

Base Small-Shell Small 4-Pin

BOTTOM VIEW

- Pin 1-Filament
Pin 2-Filament
Pin 3-No Connection
Pin 4-Internal
Connection -
Do Not Use



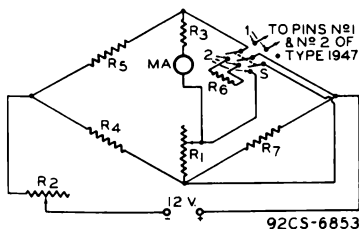
R-Series Filament-
Calibrating
Resistor in
base of tube

Maximum Ratings, Absolute Values:

FILAMENT VOLTAGE 16 max. volts

Calibration for 1947 in Accompanying Circuit:

See curve on following sheet.

PIRANI GAUGE BRIDGE CIRCUIT

R1: 50 Ohms R3 + METER: 15 Ohms R6: 120.7 Ohms
R2: 25 Ohms R4 R5: 10 Ohms each R7: 135.8 Ohms

STEP 1: With switch S in position 2, adjust R2 so that
meter reads 2.5 milliamperes.

STEP 2: With switch S in position 1, and with dry air
at atmospheric pressure in the 1947, adjust R1
so that meter reads 5.0 milliamperes.

STEP 3: With no further adjustments and with switch S
in position 1, proceed to use gauge.

JUNE 20, 1947

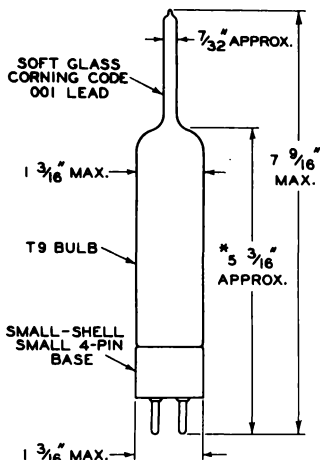
TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA

1947



1947 VACUUM-GAUGE TUBE



* MEASURED FROM END OF BASE PINS TO BULB-TOP LINE AS DETERMINED BY RING GAUGE OF $\frac{1}{2}$ " I.D.

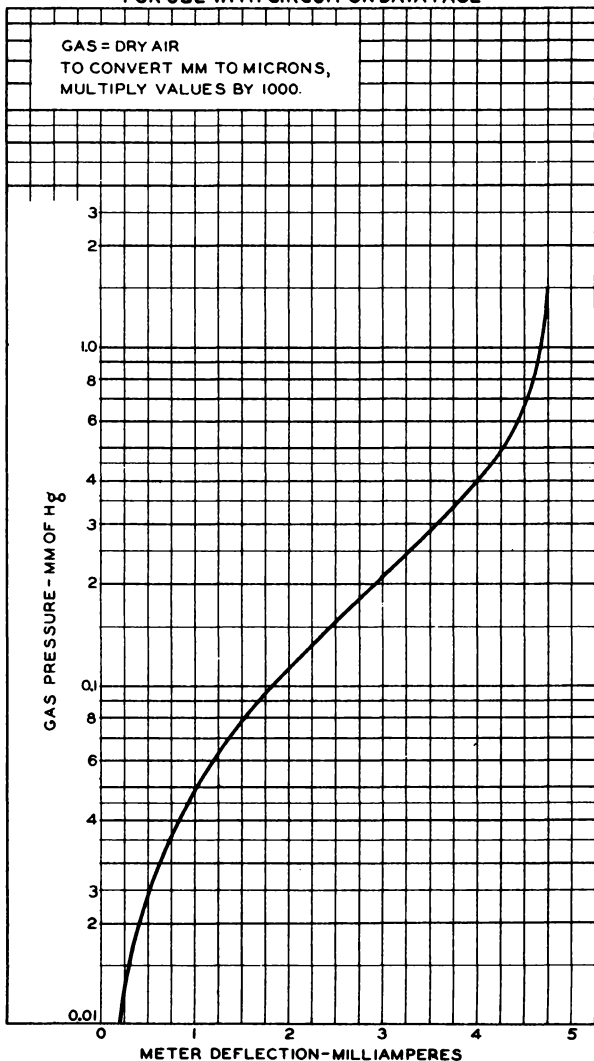
92CS-6816



1947

1947

CALIBRATION CURVE FOR USE WITH CIRCUIT ON DATA PAGE



MARCH 10, 1947

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8849



1949

1949

VACUUM-GAUGE TUBE

HARD-GLASS BULB, IONIZATION TYPE

DATA**General:**

Filament, Tungsten:*

Voltage (Approx.)	5	ac or dc volts
Current (Approx.)	3.5	amp

Maximum Tube Length (Including tubulation) 11-1/2"

Maximum Tube Radius 2-3/16"

Maximum Bulb Length 5-1/8"

Maximum Bulb Diameter 2-1/16"

Bulb T-16

Tubulation 1/2" Diameter Hard Glass,
Corning Code 772 Nonex

Operating Position Vertical with tubulation up or
down; Horizontal, with stem
press in vertical plane

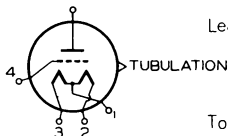
Terminal Arrangement See Outline Drawing

Terminal Lead Connections:

Lead 1 - Common
Lead to
Filaments

Lead 2 - Filament

Lead 3 - Filament
(Spare)



Lead 4 - Grid

Top Lead - Plate

Maximum Ratings, Absolute Values:

FILAMENT VOLTAGE	6.5 max.	volts
DC PLATE VOLTAGE DURING OPERATION	-100 max.	volts
DC GRID VOLTAGE DURING OPERATION	+200 max.	volts
VOLTAGE ON GRID & PLATE TIED TOGETHER DURING DEGASSING (DC OR PEAK AC)	650 max.	volts
GRID & PLATE DISSIPATION (TOTAL) DURING DEGASSING	150 max.	watts
AMBIENT TEMPERATURE DURING OPERATION	100 max.	°C
GAS PRESSURE	0.001 max.	mm of Hg

Typical Degassing Conditions:*Grid Connected to Plate*

Filament Voltage (AC or DC)	6	6	volts
Grid & Plate Voltage	350 rms	500 dc	volts
Grid & Plate Current (Average)	100	150	ma

Typical Operation:

DC Plate Voltage	-22.5	-22.5	-22.5	volts
------------------	-------	-------	-------	-------

* The 1949 contains two filaments, one of which is a spare. Values shown are for either filament operated alone. The filament voltage should be kept as low as possible during degassing because use of a low filament voltage materially increases filament life.

← Indicates a change

MARCH 1, 1954

TUBE DEPARTMENT

DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1949



1949

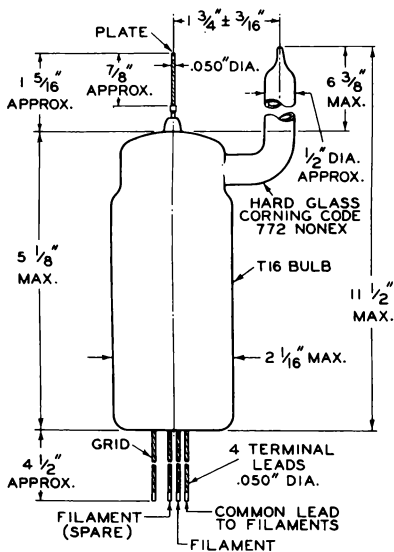
VACUUM-GAUGE TUBE

DC Grid Voltage	+80	+110	+160	volts
Grid Current	10	10	10	ma
Sensitivity	80	110	140	$\mu\text{a}/\text{micron}^\Delta$

Calibration:

See curve on following sheet.

$^\Delta$ 1 micron = 0.001 mm of mercury.



92CS-6817

MARCH 1, 1954

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

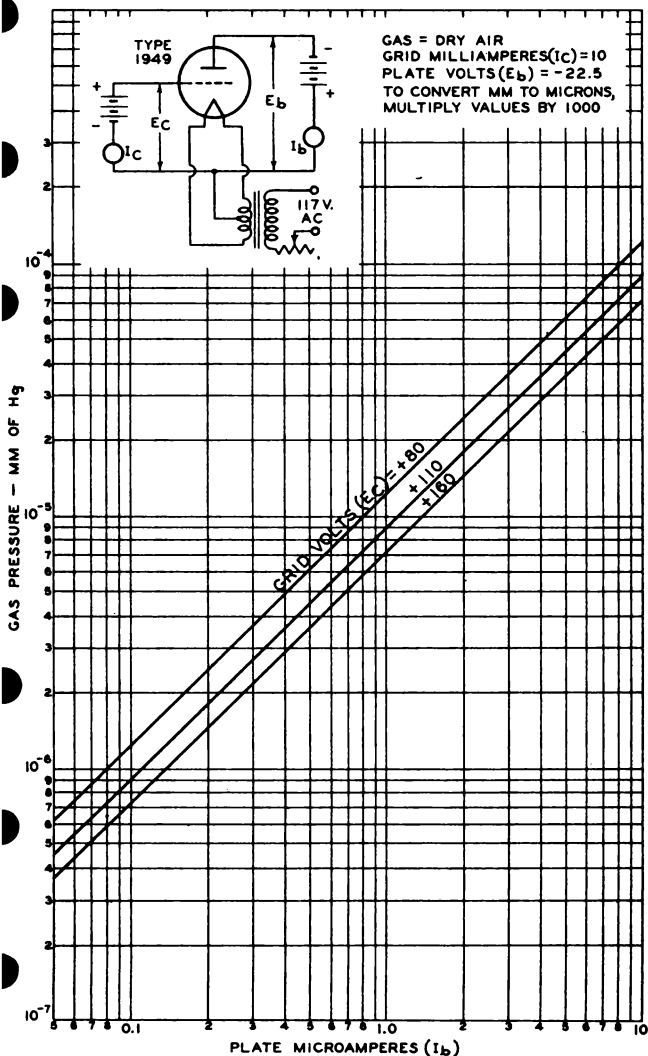
DATA



1949

1949

CALIBRATION CURVES



MAR. 11, 1947

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6851



1950

1950

VACUUM-GAUGE TUBE

SOFT-GLASS BULB, IONIZATION TYPE

DATA**General:**

Filament, Tungsten:*

Voltage (Approx.) 5 ac or dc volts

Current (Approx.) 3.5 amp

Maximum Tube Length (Including tubulation) 11-1/4"

Maximum Tube Radius 2-3/16"

Maximum Bulb Length 4-7/8"

Maximum Bulb Diameter 2-7/16"

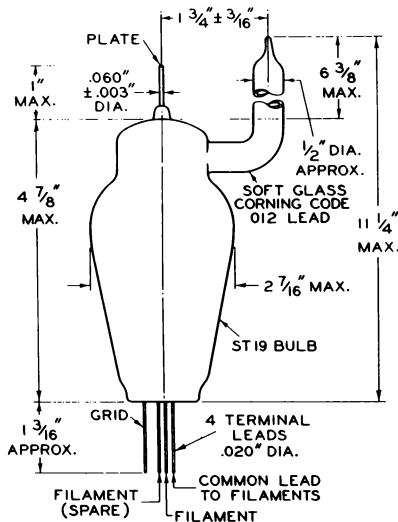
Bulb ST-19

Tubulation 1/2" Diameter Soft Glass,
Corning Code 012 LeadOperating Position Vertical, with tubulation up or
down; Horizontal with stem
press in vertical plane

Terminal Arrangement See Outline Drawing

* The 1950 contains two filaments, one of which is a spare. Values shown are for either filament operated alone. The filament voltage should be kept as low as possible during degassing because use of a low filament voltage materially increases filament life.

Maximum Ratings, Typical Degassing Conditions, Typical Operation, Calibration and Terminal Lead Connections for the 1950 are the same as for the 1949.



92CS-6818

MARCH 1, 1954

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA



5642

5642

HALF-WAVE VACUUM RECTIFIER

SUBMINIATURE TYPE

*For compact, portable high-voltage-rectifier applications***GENERAL DATA****Electrical:**

Filament, Coated:

Voltage. 1.25 ac or dc volts

Current. 0.2 amp

Direct Interelectrode Capacitance (Approx.):^oPlate to filament. 0.6 $\mu\mu\text{f}$ **Mechanical:**

Operating Position Any

Maximum Length (Excluding flexible leads). 2.380"

Length, Base Seat to Bulb Top (Excluding tip). 1.700" $\pm$ 0.060"

Diameter 0.366" to 0.400"

Bulb T3

Plate Terminal:

Minimum length 0.250"

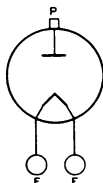
Leads, Flexible, Tinned. 2

Minimum length 1.5"

Orientation and diameter See Dimensional Outline

Maximum untinned distance from base seat 0.050"

Base Special 2-Lead



P - Plate Terminal

F - Filament Lead

PULSED-RECTIFIER SERVICE**Maximum and Minimum Ratings, Design-Center Values:***For operation in a 525-line, 30-frame system^o*

PEAK INVERSE PLATE VOLTAGE 10000 max. volts

PEAK PLATE CURRENT 5 max. ma

DC PLATE CURRENT 0.25 max. ma

FREQUENCY OF SUPPLY VOLTAGE. 5 min. kc

Typical Operation:Peak-Pulse Plate Voltage^o. 8000 volts

DC Output Voltage (2 tubes). 12000 volts

DC Output Current. 0.15 ma

Characteristics:

Plate Current for plate volts = 30 4 ma

^o, ^o, ^o: See next page.

5642



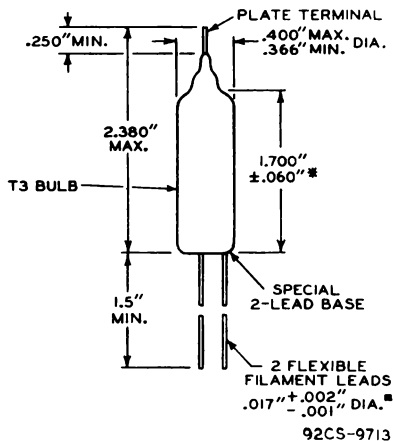
5642

HALF-WAVE VACUUM RECTIFIER

- Without external shield.
- As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission.
- The duration of the voltage pulse must not exceed 15 per cent of one horizontal scanning cycle. In a 525-line, 30-frame system, 15 per cent of one horizontal scanning cycle is 10 microseconds.

OPERATING CONSIDERATIONS

The *flexible leads* of the 5642 are usually soldered to the circuit elements. Soldering of the connections should be made as far as possible from the glass button and the glass tip. If this precaution is not followed, the heat of the soldering operation will crack the glass seals of the leads and damage the tube.



* Measured from base seat to bulb-top line as determined by a ring gauge of 0.210" ± 0.001" inside diameter.

■ The specified lead diameter applies only in the zone between 0.050" and 0.250" from the base seat. Between 0.250" and 1.500", a maximum diameter of 0.021" is held. Outside of these zones, the lead diameter is not controlled.



5651

VOLTAGE-REFERENCE TUBE

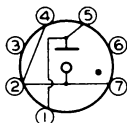
MINIATURE GLOW-DISCHARGE TYPE

5651

DATA**General:**

Cathode. Cold
 Maximum Overall Length 2-1/8"
 Maximum Seated Length 1-7/8"
 Length from Base Seat to Bulb Top (excluding tip) 1-1/2" $\pm$ 3/32"
 Maximum Diameter 3/4"
 Bulb T-5-1/2
 Mounting Position. Any
 Base Small-Button Miniature 7-Pin
 Basing Designation for BOTTOM VIEW 5B0

Pin 1 - Anode
 Pin 2 - Cathode
 Pin 3 - Internal
 Connection
 -Do Not Use
 Pin 4 - Cathode



Pin 5 - Anode
 Pin 6 - Internal
 Connection
 -Do Not Use
 Pin 7 - Cathode

Maximum Ratings, Absolute Values:

DC OPERATING CURRENT (Continuous). 3.5 max. ma
 AMBIENT TEMPERATURE RANGE. -55 to +90 °C

Characteristics and Operation Range Values:

	<u>Min.</u>	<u>Avg.</u>	<u>Max.</u>	
DC Starting Voltage.	-	107	115*	volts
DC Operating Voltage	82	87	92	volts
DC Operating Current	1.5	-	3.5	ma
Regulation (1.5 ma. to 3.5 ma.)	-	-	3	volts
Stability [□]	-	-	0.1	volt

Circuit Values:

Shunt Capacitor. - - 0.02 μ f
 Series Resistor. See NOTE Below

* A supply voltage of not less than this value should be provided to insure "starting" throughout tube life.

□ Defined as the maximum voltage fluctuation at any current level within the operating current range.

NOTE: A series resistor must always be used with the 5651. The resistance value must be chosen so that (1) the maximum current rating of 3.5 ma. is not exceeded at the highest anode-supply voltage employed, and (2) the minimum current rating of 1.5 ma. is always exceeded when the anode-supply voltage is at its lowest value.

MAR. 15, 1948

TUBE DEPARTMENT

TENTATIVE DATA

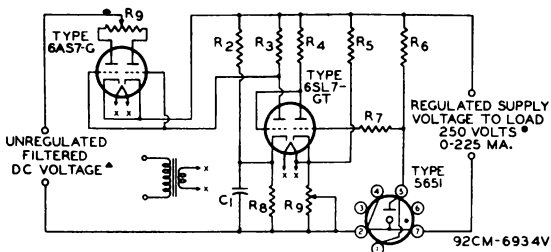
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5651



5651

VOLTAGE-REFERENCE TUBE

 SERIES TYPE OF STABILIZED VOLTAGE SUPPLY USING
 RCA-5651 AS VOLTAGE-REFERENCE TUBE


$C_1 = 0.1 \mu f$, 400 volts
 R_1 = Plate current balancing potentiometer, 160 ohms, 10 watts
 R_2 = 12000 ohms, 2 watts
 R_3 = 470000 ohms, 0.5 watt
 R_4 = 470000 ohms, 0.5 watt

R_5 = 12000 ohms, 2 watts
 R_6 = 68000 ohms, 1 watt
 R_7 = 1 megohm, 0.5 watt
 R_8 = 15000 ohms, 2 watts
 R_9 = Output voltage control potentiometer, 10000 ohms

- ▲ 375 volts approx. at zero load current; 325 volts approx. at 225 milliamperes load current.
- The voltage regulation of this supply operated at a fixed line voltage of 117 volts and an output voltage of 250 volts is less than 0.2 volt over the current range of 0 to 225 milliamperes. At full current, the regulation for a variation of ± 10 per cent in line voltage is less than 0.1 volt. Socket connections for the 5651 are made so that removal of the 5651 from its socket opens the load.



5654

SHARP-CUTOFF PENTODE

MINIATURE TYPE

5654
PREMIUM TYPE

Intended for RF and IF Broad-Band Applications where dependable performance under shock and vibration are paramount. The 5654 is a "premium" version of the 6AK5.

GENERAL DATA

Electrical:

Heater, Pure Tungsten, for Unipotential Cathode:

Voltage $6.3 \pm 10\%$ ac or dc volts

Current 0.175 amp

Direct Interelectrode Capacitances: [▲]

Grid No.1 to Plate 0.020 max. μf

Input 4.0 μf

Output 2.85 μf

Mechanical:

Mounting Position Any

Maximum Overall Length 1-3/4"

Maximum Seated Length 1-1/2"

Length from Base Seat to Bulb Top
(Excluding tip) 1-1/8" $\pm 3/32$ "

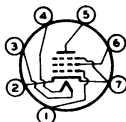
Maximum Diameter 3/4"

Bulb T-5-1/2

Base Small-Button Miniature 7-Pin (JETEC No.E7-1)

BOTTOM VIEW

Pin 1-Grid No.1
Pin 2-Cathode,
Grid No.3,
Int. Shield
Pin 3-Heater
Pin 4-Heater



Pin 5-Plate
Pin 6-Grid No.2
Pin 7-Cathode,
Grid No.3,
Int. Shield

AMPLIFIER - Class A₁

Maximum Ratings, Absolute Values:

PLATE VOLTAGE 200 max. volts

GRID-No.2 (SCREEN) VOLTAGE 155 max. volts

PLATE DISSIPATION 1.85 max. watts

GRID-No.2 INPUT 0.55 max. watt

CATHODE CURRENT 20 max. ma

PEAK HEATER-CATHODE VOLTAGE:

Heater positive with respect to cathode 100 max. volts

Heater negative with respect to cathode 100 max. volts

Typical Operation and Characteristics:

Plate Voltage 120 180 volts

Grid-No.2 Voltage 120 120 volts

[▲] According to RTMA Standard ET-109A with external shield No.316.

5654



5654

SHARP-CUTOFF PENTODE

Cathode-Bias Resistor	180	180	ohms
Plate Resistance (Approx.) . . .	0.30	0.50	megohm
Transconductance	5000	5100	μ mhos
Plate Current	7.5	7.7	ma
Grid-No.2 Current	2.5	2.4	ma
Grid-No.1 Voltage (Approx.) for plate current of 10 μ amp .	-8.5	-8.5	volts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	0.5 max.	megohm
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SPECIAL RATINGS & PERFORMANCE DATA**Shock Rating:**

Impact Acceleration	500 max.	g
Tubes are held rigid in three different positions in a Navy Type, High Impact (flyweight) Shock Machine and are subjected to 500 g impact acceleration.		

Fatigue Rating:

Vibrational Acceleration	2.5 max.	g
Tubes are rigidly mounted and subjected in each of three positions to 2.5 g vibrational acceleration at 60 cycles per second for 32 hours.		

Heater Cycling Life Performance:

Cycles of Intermittent Operation . . .	2000 min.	cycles
Under the following conditions: With heater voltage of 7.5 volts cycled 1 minute on and 1 minute off, heater positive with respect to cathode by +100 volts dc, and plate, grid-No.2, and grid-No.1 voltage = 0 volts.		

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	Min.	Max.	
Heater Current	1	0.160	0.190	amp
Grid-No.1-to-Plate Capacitance	-	-	0.020	μ f
Input Capacitance	-	3.4	4.6	μ f
Output Capacitance	-	2.45	3.25	μ f
Plate Current	1,2	3.0	12.0	ma
Transconductance	1,2	3500	6500	μ mhos
Reverse Grid Current	1,3	-	0.1	μ amp

Note 1: With 6.3 volts ac on heater.

Note 2: With plate voltage of 120 volts, grid-No.2 voltage of 120 volts, and grid-No.1 voltage of -2 volts.

Note 3: With plate voltage of 120 volts, grid-No.2 voltage of 120 volts, grid-No.1 voltage of -2 volts, and grid-No.1 resistor of 0.1 megohm.

CURVES

are the same as shown for Type 6AK5
in the Receiving Tube Section

JAN. 1, 1953

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA



5675

5675

UHF MEDIUM-MU TRIODE

"PENCIL TYPE" FOR GROUNDED-GRID SERVICE

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathode:

Voltage. 6.3 ac or dc volts

Current. 0.135 amp

Direct Interelectrode Capacitances:

Grid to Plate. 1.3 μf Grid to Cathode. 2.3 μf Plate to Cathode 0.09 max. μf **Characteristics, Class A₁ Amplifier:**

Plate Voltage. 135 volts

Cathode-Bias Resistor. 68 ohms

Amplification Factor 20

Plate Resistance 3225 ohms

Transconductance 6200 μhos

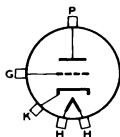
Plate Current. 24 ma

Mechanical:

Terminal Connections:

H—Heater

K—Cathode



G—Grid

P—Plate

Mounting Position. Any

Dimensions See Outline Drawing

RF POWER AMPLIFIER & OSCILLATOR—Class C**Maximum Ratings, Absolute Values:**

DC PLATE VOLTAGE 165 max. volts

DC GRID VOLTAGE. -90 max. volts

DC CATHODE CURRENT 30 max. ma

DC GRID CURRENT. 8 max. ma

PLATE INPUT. 5 max. watts

PLATE DISSIPATION* 5 max. watts

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode. 90 max. volts

Heater positive with respect to cathode. 90 max. volts

PLATE-SEAL TEMPERATURE 175 max. °C

Typical Operation as Grounded-Grid Oscillator at 1700 Mc:*

DC Plate Voltage 120 volts

DC Grid Voltage. -8 volts

From a grid resistor of. 2000 ohms

* In applications where the plate dissipation exceeds 2.5 watts, it is important that a large area of contact be provided between the plate cylinder and its lead connector to provide adequate heat conduction.

* At 3000 Mc, and with full ratings, a useful output of approximately 50 milliwatts may be obtained.

FEB. 1, 1950

TUBE DEPARTMENT

TENTATIVE DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5675



5675

UHF MEDIUM-MU TRIODE

DC Plate Current	25	ma
DC Grid Current (Approx.)	4	ma
Power Output (Approx.)	475	mw

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	<u>Note</u>	<u>Min.</u>	<u>Max.</u>	
Heater Current	1	0.125	0.145	amp
Grid-to-Plate Capacitance. .	-	1.1	1.5	$\mu\mu\text{f}$
Grid-to-Cathode Capacitance.	-	2.0	2.6	$\mu\mu\text{f}$
Plate-to-Cathode Capacitance	-	-	0.09	$\mu\mu\text{f}$

Note 1: With 6.3 volts ac or dc on heater.

INSTALLATION NOTES

Connections to the cathode cylinder, grid disk, and plate cylinder should be made by flexible spring contacts only. The connectors must make firm, large-surface contact, yet must be sufficiently flexible so that no part of the tube is subjected to strain. Unless this recommendation is observed, the glass-to-metal seals may be damaged.

FEB. 1, 1950

TUBE DEPARTMENT

TENTATIVE DATA

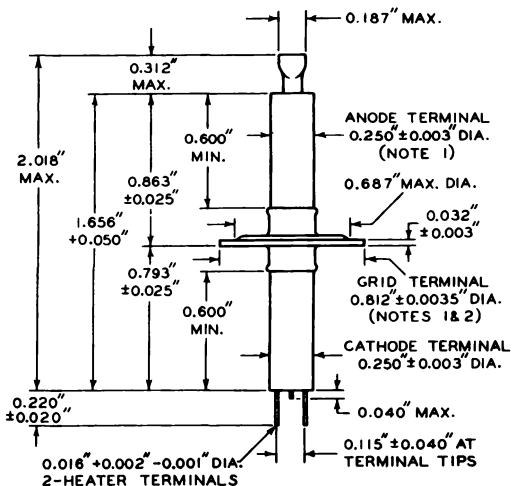
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



5675

5675

UHF MEDIUM-MU TRIODE



92CS-7340R1

NOTE 1: MAX. ECCENTRICITY OF ϕ (AXIS) OF ANODE TERMINAL OR GRID-TERMINAL FLANGE WITH RESPECT TO THE ϕ (AXIS) OF THE CATHODE TERMINAL IS 0.008".

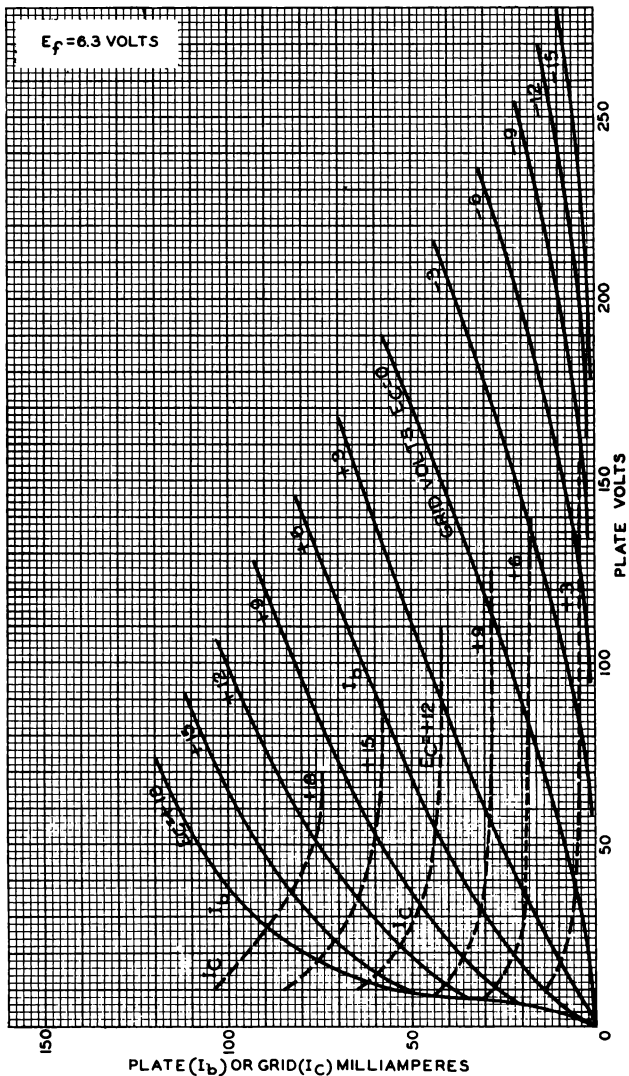
NOTE 2: TILT OF GRID-TERMINAL FLANGE WITH RESPECT TO ROTATIONAL AXIS OF CATHODE TERMINAL IS DETERMINED BY CHUCKING THE CATHODE TERMINAL, ROTATING THE TUBE, AND GAUGING THE TOTAL TRAVEL DISTANCE OF THE GRID-TERMINAL FLANGE PARALLEL TO THE AXIS AT A POINT APPROXIMATELY 0.020" INWARD FROM ITS EDGE FOR ONE COMPLETE ROTATION. THE TOTAL TRAVEL DISTANCE WILL NOT EXCEED 0.020".

5675



5675

AVERAGE PLATE CHARACTERISTICS



AUG. 23, 1949

TUBE DEPARTMENT

92CM-7343

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



5686

BEAM POWER TUBE

9-PIN MINIATURE TYPE

For af or rf power-amplifier
applications at frequencies up to 160 Mc

5686
PREMIUM TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage. 6.3 ac or dc volts

Current. 0.35 amp

Direct Interelectrode Capacitances:

	Without External Shield	With External Shield ⁰	
Grid No.1 to plate	0.11 max.	0.08 max.	μf
Grid No.1 to cathode & grid No.3, grid No.2, and heater.	6.4	6.5	μf
Plate to cathode & grid No.3, grid No.2, and heater.	4	8.5	μf

Mechanical:

Operating Position Any

Maximum Overall Length 2-3/16"

Maximum Seated Length. 1-15/16"

Length, Base Seat to Bulb Top (Excluding tip). .1-9/16" $\pm$ 3/32"

Diameter 0.750" to 0.875"

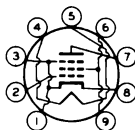
Dimensional Outline. See General Section

Bulb T6-1/2

Base Small-Button Noval 9-Pin (JEDEC No.E9-1)

Basing Designation for BOTTOM VIEW 9G

Pin 1-Cathode,
Grid No.3
Pin 2-Grid No.1
Pin 3-Cathode,
Grid No.3
Pin 4-Heater



Pin 5-Heater
Pin 6-Grid No.2
Pin 7-Plate
Pin 8-Cathode,
Grid No.3
Pin 9-Grid No.2

AUDIO-FREQUENCY POWER AMPLIFIER — Class A₁

Maximum Ratings, Absolute Values:

PLATE VOLTAGE. 275 max. volts

GRID-No.2 (SCREEN-GRID) VOLTAGE. 275 max. volts

GRID-No.2 INPUT. 3.3 max. watts

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode. 100 max. volts

Heater positive with respect to cathode. 100 max. volts

Typical Operation and Characteristics:

Plate Voltage. 250 volts

Grid-No.2 Voltage. 250 volts

⁰: See next page.

4-59

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA 1

5686



5686

BEAM POWER TUBE

Grid-No.1 (Control-Grid) Voltage.	-12.5	volts
Peak AF Grid-No.1 Voltage	12.5	volts
Zero-Signal Plate Current	27	ma
Zero-Signal Grid-No.2 Current	3	ma
Plate Resistance (Approx.)	45000	ohms
Transconductance.	3100	μ mhos
Load Resistance	9000	ohms
Max.-Signal Power Output.	2.7	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:

For fixed-bias operation.	0.1 max. megohm
For cathode-bias operation.	0.5 max. megohm

RADIO-FREQUENCY POWER AMPLIFIER — Class C**Maximum Ratings, Absolute Values:**

PLATE VOLTAGE	275 max.	volts
GRID-No.2 (SCREEN-GRID) VOLTAGE	275 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE.	-165 max.	volts
PLATE CURRENT	44 max.	ma
GRID-No.2 CURRENT	16.5 max.	ma
GRID-No.1 CURRENT	3.3 max.	ma
PLATE INPUT	11 max.	watts
GRID-No.2 INPUT	3.3 max.	watts
PLATE DISSIPATION	8.25 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode.	100 max.	volts
Heater positive with respect to cathode.	100 max.	volts

Typical Operation:*At frequencies up to 160 Mc*

Plate Voltage	250	250	volts
Grid-No.2 Voltage	180	250	volts
Grid-No.1 Voltage	-30	-50	volts
From grid-No.1 resistor of.	15000	25000	ohms
Peak RF Grid-No.1 Voltage	50	75	volts
Plate Current	30	40	ma
Grid-No.2 Current (Approx.)	6.5	10.5	ma
Grid-No.1 Current (Approx.)	2	2	ma
RF Grid-No.1 Driving Power (Approx.)	0.1	0.15	watt
Power Output (Approx.)	5	6.5	watts
Useful Power Output at 125 Mc	-	5.25	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance.	50000 max.	ohms
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^o With external shield JEDEC No.315 connected to cathode & grid No.3.



5686

5686

BEAM POWER TUBE

SPECIAL RATINGS & PERFORMANCE DATA

Shock Rating:

This test is performed on a sample lot of tubes from each production run. Tubes are held rigid and are subjected in four different positions to an impact acceleration of 450 g.

Fatigue Rating:

This test is performed on a sample lot of tubes from each production run. Tubes are rigidly mounted and subjected to 2.5 g vibrational acceleration at a fixed frequency of 25 cycles per second for 100 hours in each of three positions.

Heater-Cycling Life Performance:

This test is performed on a sample lot of tubes from each production run. Tubes will withstand a minimum of 2000 cycles of intermittent operation under the following conditions: heater volts = 7.5 cycled one minute on and one minute off, heater 100 volts positive with respect to cathode, and all other elements connected to ground.



5687

MEDIUM-MU TWIN TRIODE

9-PIN MINIATURE TYPE

5687

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:

Heater arrangement	Series	Parallel	
Voltage	12.6	6.3	ac or dc volts
Current	0.45	0.9	amp

Direct Interelectrode Capacitances (Approx.):^o

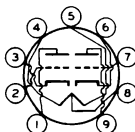
Grid to plate (Each unit)	4	$\mu\mu\text{f}$
Grid to cathode and heater (Each unit)	4	$\mu\mu\text{f}$
Plate to cathode and heater:		
Unit No.1	0.6	$\mu\mu\text{f}$
Unit No.2	0.5	$\mu\mu\text{f}$
Heater to cathode (Each unit)	7	$\mu\mu\text{f}$
Grid to grid.	0.025	$\mu\mu\text{f}$
Plate to plate.	0.75	$\mu\mu\text{f}$

Characteristics, Class A₁ Amplifier (Each Unit):

Plate Voltage	120	180	250	volts
Grid Voltage.	-2	-7	-12.5	volts
Amplification Factor.	18	17	16	
Plate Resistance (Approx.)	1560	2000	3000	ohms
Transconductance.	11500	8500	5400	μmhos
Plate Current	36	23	12	ma
Grid Voltage (Approx.) for plate $\mu\text{a} = 100$	-9	-14	-19	volts

Mechanical:

Operating Position.	Any
Maximum Overall Length.	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip).	1-9/16" $\pm$ 3/32"
Diameter.	0.750" to 0.875"
Dimensional Outline	See General Section
Bulb.	T6-1/2
Base.	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW.	.9H

Pin 1-Plate of
Unit No.2Pin 2-Grid of
Unit No.2Pin 3-Cathode of
Unit No.2Pins 4 & 8-Heater of
Unit No.2Pins 5 & 8-Heater of
Unit No.1Pin 6-Cathode of
Unit No.1Pin 7-Grid of
Unit No.1Pin 8-Heater
Mid-TapPin 9-Plate of
Unit No.1^o: See next page.

5687



5687

MEDIUM-MU TWIN TRIODE

AMPLIFIER — Class A₁*Values are for Each Unit***Maximum Ratings, Absolute Values:**

PLATE VOLTAGE.	330 max.	volts
GRID CURRENT	6.6 max.	ma
PLATE DISSIPATION:		
Either plate	4.2 max.	watts
Both plates (Both units operating) . . .	7.5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode.	100 max.	volts
Heater positive with respect to cathode.	100 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	220 max.	°C

Maximum Circuit Values:

Grid-Circuit Resistance.	1 max.	megohm
----------------------------------	--------	--------

° Without external shield.



5690

5690
SPECIAL
TUBE RED**FULL-WAVE VACUUM RECTIFIER**

Intended for critical industrial and aircraft applications where 10,000-hour life, extreme uniformity, rigid construction, and exceptional stability are paramount.

GENERAL DATA**Electrical:**

Heaters, Pure Tungsten, for Unipotential Cathodes:

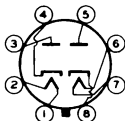
Of Units 1 & 2 connected in	Series	Parallel	
Voltage	12.6 $\pm$ 5%*	6.3 $\pm$ 5%*	volts
Current	1.2	2.4	amp

Mechanical:

Mounting Position	Any
Maximum Overall Length	4-1/4"
Maximum Seated Length	3-11/16"
Maximum Diameter	1-23/32"
Bulb	T-12
Base	Short Jumbo-Shell Octal 8-Pin, Non Hygroscopic (JETEC No. B8-71)

BOTTOM VIEW

Pin 1: Heater of
Unit No.2
Pin 2: Heater of
Unit No.2
Pin 3: Plate of
Unit No.2
Pin 4: Cathode of
Unit No.2



Pin 5: Plate of
Unit No.1
Pin 6: Heater of
Unit No.1
Pin 7: Heater of
Unit No.1
Pin 8: Cathode of
Unit No.1

RECTIFIER**Maximum Ratings, Absolute Values: For supply frequency of 60 cps****For Altitudes
up to 40000 Feet**

PEAK INVERSE PLATE VOLTAGE	1120 max. volts
PEAK VOLTAGE BETWEEN PLATE OF UNIT No.1 AND PLATE OF UNIT No.2	1120 max. volts
PEAK PLATE CURRENT PER PLATE	375 max. ma
AC PLATE SUPPLY VOLTAGE (RMS) PER PLATE	See Rating Chart I
DC OUTPUT CURRENT PER PLATE	See Rating Chart I

HOT-SWITCHING CURRENT:

Even occasional hot-switching with capacitor-input circuits permits the flow of plate currents having magnitudes which can adversely affect the life and reliability of tubes designed for life values in the order of 10000 hours. If capacitor-input circuits are to be used, protect the circuits against the possibility of hot-switching and do not exceed a maximum peak current value per plate of 3 amperes during the initial cycles of the hot-switching transient. If hot-switching is required in operation, the use of choke-input circuits is recommended for maximum reliability and for long life. Such circuits limit the hot-switching current to a value no higher than that of the peak plate current.

* May deviate $\pm$ 10 per cent from rated value provided such deviation occurs for less than 2 per cent of operating time.

APRIL 1, 1953

TUBE DEPARTMENT

TENTATIVE DATA 1

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5690



5690

FULL-WAVE VACUUM RECTIFIER

PEAK HEATER-CATHODE VOLTAGE:*

Heater negative with respect to cathode . . .	400 max.	volts
Heater positive with respect to cathode . . .	400 max.	volts
BULB TEMPERATURE.	200 max.	°C

Typical Operation as Full-Wave Rectifier

with Capacitor-Input Filter:

AC Plate-to-Plate Supply Voltage (RMS). . . .	700	volts
Filter-Input Capacitor [▲]	10	μf
Effective Plate-Supply Resistance per Plate .	350	ohms
DC Output Voltage at Input to Filter (Approx.):		
At half-load current of 55 ma	415	volts
At full-load current of 110 ma	355	volts
Voltage Regulation (Approx.):		
Half-load to full-load current	60	volts

Typical Operation as Full-Wave Rectifier

with Choke-Input Filter:

AC Plate-to-Plate Supply Voltage (RMS). . . .	700	volts
Filter Input Choke	10	henries
DC Output Voltage at Input to Filter (Approx.):		
At half-load current of 67.5 ma	305	volts
At full-load current of 135 ma	300	volts
Voltage Regulation (Approx.):		
Half-load to full-load current	5	volts

SPECIAL RATINGS & PERFORMANCE DATA

Shock Rating:

Impact Acceleration	500 max.	g
Tubes are held rigid in three different positions in a Navy Type, High Impact (flyweight) Shock Machine and are subjected to 500 g impact acceleration.		

Fatigue Rating:

Vibrational Acceleration	2.5 max.	g
Tubes are rigidly mounted and subjected in each of three positions to 2.5 g vibrational acceleration at 25 cycles per second for 32 hours.		

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	Min.	Max.	
Heater Current	1	2.30	2.50	amp

* For maximum reliability, it is recommended that the cathode of each unit be connected directly to the mid-point or one side of the heater winding.

▲ Higher values of capacitance than indicated may be used but the effective plate-supply resistance should be increased to prevent exceeding the maximum rating for peak plate current. See Rating Chart II.

APRIL 1, 1953

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA 1



5690

5690

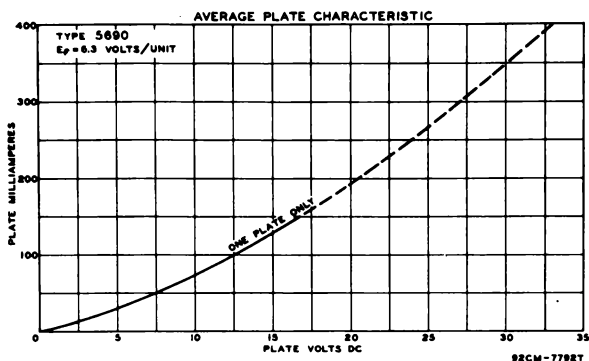
FULL-WAVE VACUUM RECTIFIER

	Note	Min.	Max.
Heater-Cathode Current:			
Heater negative with respect to cathode . . .	1,2	—	30 μ amp
Heater positive with respect to cathode . . .	1,2	—	30 μ amp
Tube Voltage Drop	1,3	15	19 volts

Note 1: With 6.3 volts on heater of Unit No.1 connected in parallel with heater of Unit No.2.

Note 2: With 300 volts between heater and cathode.

Note 3: With dc voltage per plate adjusted to give dc plate current of 150 ma. per unit.

**RATING CHARTS and OPERATION CHARACTERISTICS**

Rating Chart I represents graphically the relationships between absolute maximum ac voltage input and absolute maximum dc output current derived from the fundamental ratings for conditions of capacitor-input and choke-input filters. This graphical presentation gives the equipment designer considerable latitude in choice of operating conditions.

Rating Chart II represents graphically the relationships between maximum rectification efficiency and absolute maximum dc output current per plate for conditions of capacitor input to filter.

Rating Chart III represents graphically the relationships between minimum plate-supply resistance per plate and absolute maximum ac plate-supply voltage per plate under no-load conditions for conditions of capacitor input to filter when occasional hot-switching is employed.

APRIL 1, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA 2

5690

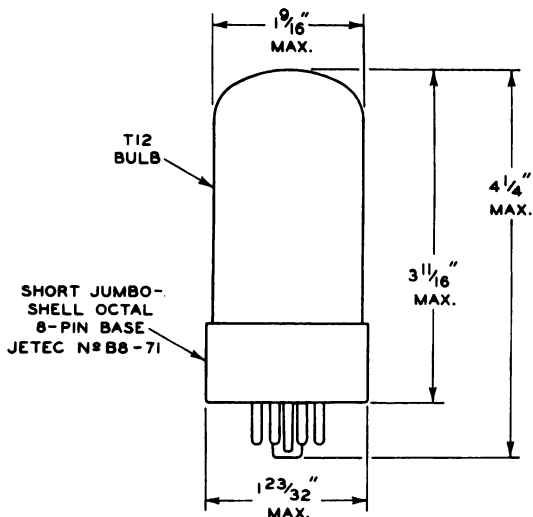


5690

FULL-WAVE VACUUM RECTIFIER

The Operation Characteristics for the 5690 in Full-Wave Circuit with $4\mu\text{f}$, $10\mu\text{f}$, and $20\mu\text{f}$ -Capacitor Input to Filter show not only typical operating curves for different plate-supply voltages and different effective plate-supply resistances, but also by means of boundary line "AED" the limiting current and voltage relationships presented on Rating Chart I.

The Operation Characteristics for the 5690 in Full-Wave Circuit with Choke Input to Filter show not only typical operating curves for different plate-supply voltages but also by means of boundary line "ABC" the limiting current and voltage relationships presented on Rating Chart I. These curves also give information as to the effect of various sizes of chokes on regulation. The solid-line curves show the dc voltage outputs which would be obtained if the filter chokes had infinite inductance. The long-dash lines radiating from the zero position are boundary lines for various sizes of chokes as indicated. The intersection of one of these lines with a solid-line curve indicates the point on the curve at which the choke no longer behaves as though it had infinite inductance. To the left of the choke boundary line, the regulation curves depart from the solid-line curves as shown by the representative short-dash regulation curves.



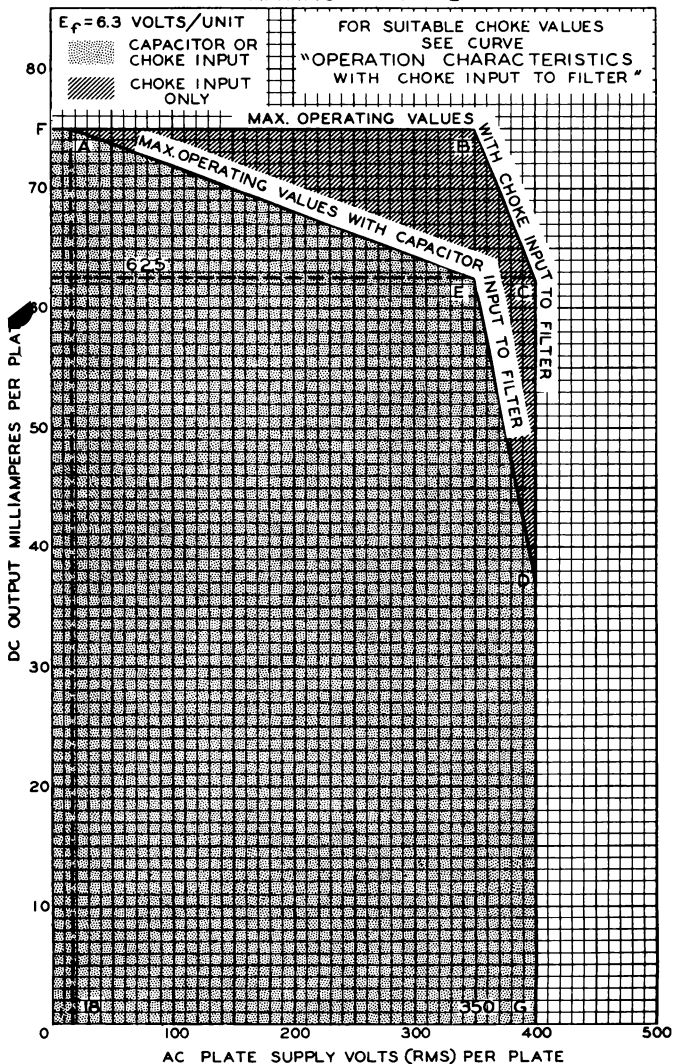
92CS-7810

APRIL 1, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA 2

RATING CHART I



5690



5690

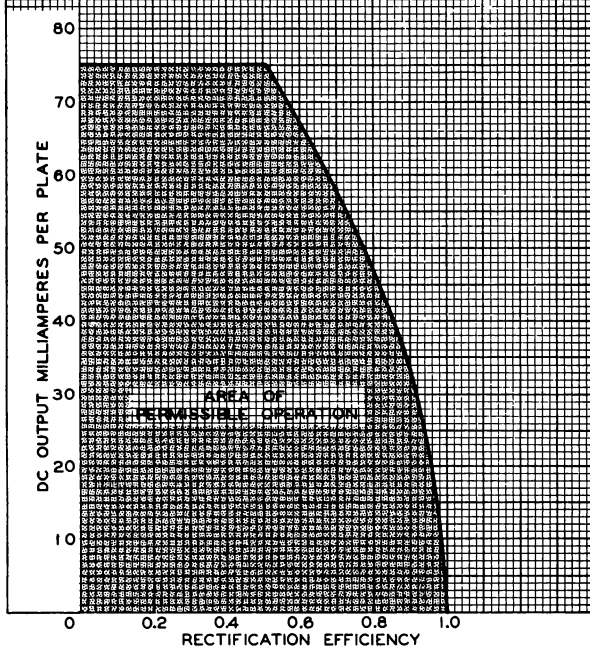
RATING CHART II CAPACITOR INPUT TO FILTER

 $E_f = 6.3 \text{ VOLTS/UNIT}$

MAX. PEAK PLATE CURRENT PER PLATE = 375 MA

$$\text{RECTIFICATION EFFICIENCY} = \frac{\bar{E}}{\sqrt{2} E_s}$$

 WHERE $\bar{E}$ = DC OUTPUT VOLTS AT INPUT TO FILTER

 E_s = AC PLATE SUPPLY VOLTS (RMS) PER PLATE


JAN. 9, 1953

 TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

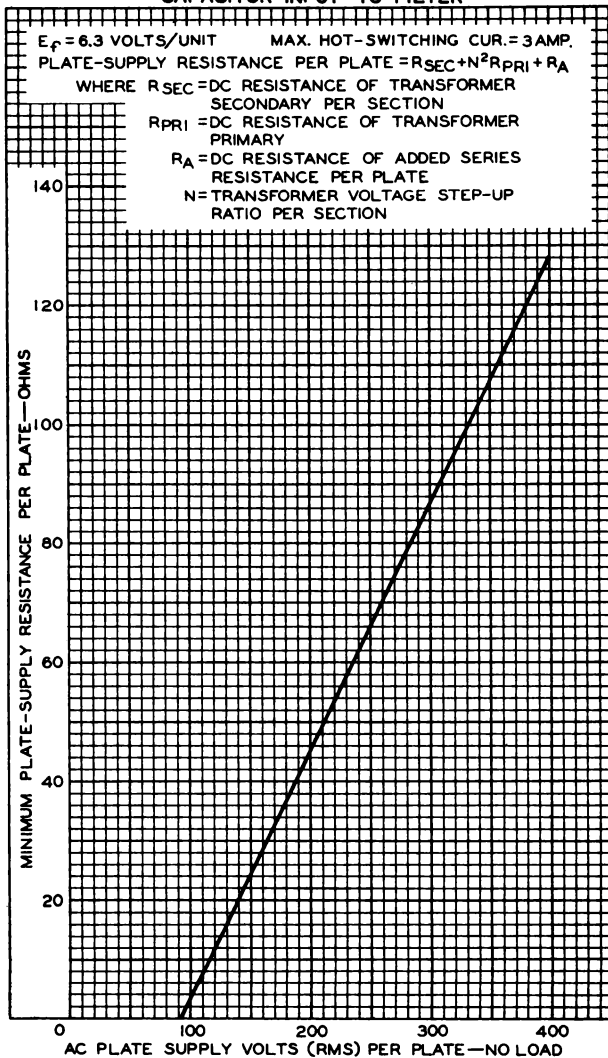
92CM-7894



5690

5690

RATING CHART III CAPACITOR INPUT TO FILTER



JAN. 9, 1953

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RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7895



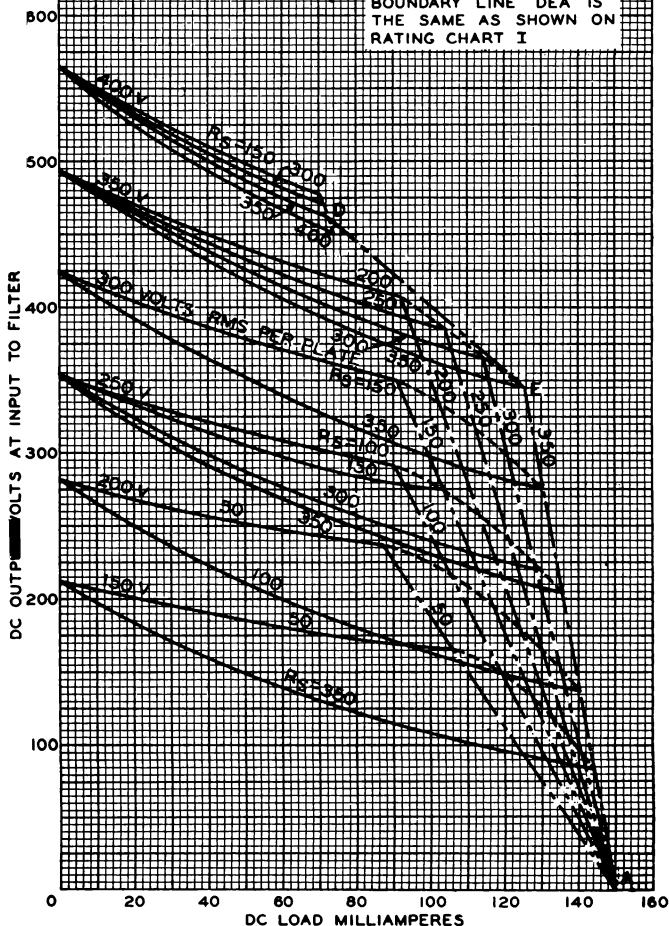
5690

5690

OPERATION CHARACTERISTICS FULL-WAVE CIRCUIT, CAPACITOR INPUT TO FILTER

$E_f = 6.3$ VOLTS/UNIT
CAPACITOR (C) INPUT TO FILTER: $C = 10\mu f$
TOTAL EFFECTIVE PLATE-SUPPLY RESISTANCE (OHMS) = R_s
SUPPLY FREQUENCY = 60 CPS

CURRENT-AND-VOLTAGE
BOUNDARY LINE 'DEA' IS
THE SAME AS SHOWN ON
RATING CHART I



MAY 12, 1952

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7795

5690



5690

OPERATION CHARACTERISTICS FULL-WAVE CIRCUIT, CAPACITOR INPUT TO FILTER

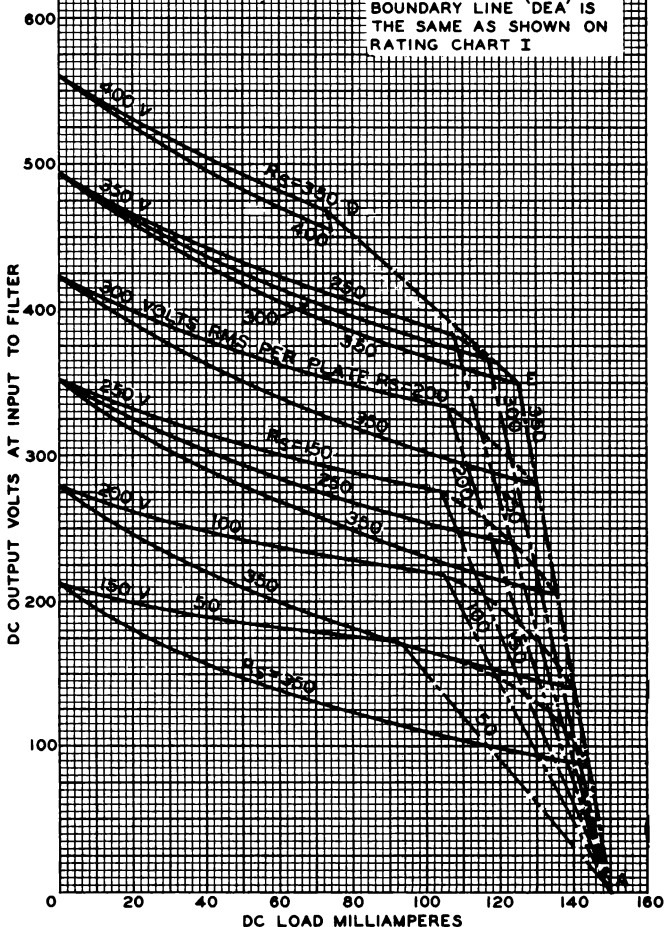
$E_f = 6.3$ VOLTS/UNIT

CAPACITOR (C) INPUT TO FILTER: $C = 20\mu f$

TOTAL EFFECTIVE PLATE-SUPPLY RESISTANCE (OHMS) $= R_s$

SUPPLY FREQUENCY = 60 CPS

CURRENT-AND-VOLTAGE
BOUNDARY LINE 'DEA' IS
THE SAME AS SHOWN ON
RATING CHART I



MAY 7, 1952

TUBE DEPARTMENT

92CM-7793

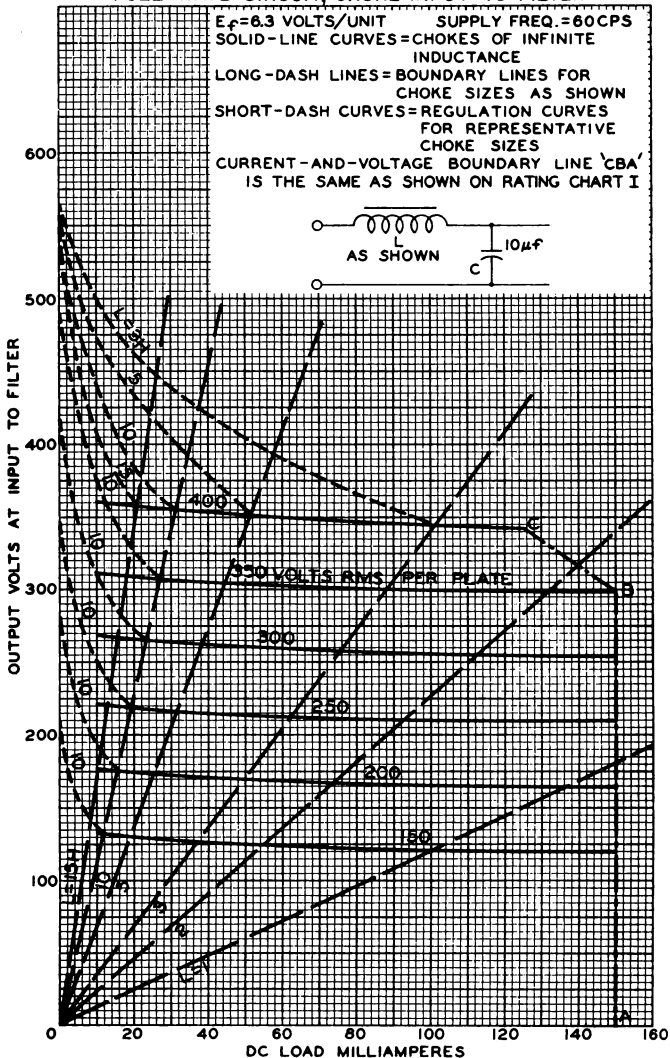
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



5690

5690

OPERATION CHARACTERISTICS FULL-WAVE CIRCUIT, CHOKE INPUT TO FILTER





5691

HIGH-MU TWIN TRIODE

5691
SPECIAL
TUBE RED

Intended for critical industrial applications where 10,000-hour life, extreme uniformity, rigid construction, and exceptional stability are paramount. Within its ratings, the 5691 may be used to replace its receiving-tube counterpart, type 6SL7-GT, where heater transformer will carry increased current.

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathodes:

Voltage. $6.3 \pm 5\%$ * . . . ac or dc volts

Current. 0.6 amp

Direct Interelectrode Capacitances:⁰

	Min.	Au.	Max.	
Triode No.1:				
Grid to Plate.	3.1	3.6	4.1	μf
Grid to Cathode.	1.9	2.4	2.9	μf
Plate to Cathode	1.8	2.3	2.8	μf
Triode No.2:				
Grid to Plate.	3.1	3.6	4.1	μf
Grid to Cathode.	2.2	2.7	3.2	μf
Plate to Cathode	2.1	2.6	3.1	μf
Plate of Triode No.1 to				
Plate of Triode No.2	0.27	0.32	0.37	μf

* May deviate $\pm 10\%$ from rated value provided such deviation occurs for less than 2% of the operating time.

⁰ With no external shield.

Mechanical:

Mounting Position. Any

Maximum Overall Length 2-7/8"

Maximum Seated Length. 2-5/16"

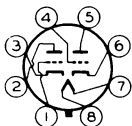
Maximum Diameter 1-9/32"

Bulb T-9

Base Short Intermediate-Shell Octal
8-Pin, Non-Hygroscopic

Basing Designation for BOTTOM VIEW 8BD

Pin 1-Grid of
Triode No.2
Pin 2-Plate of
Triode No.2
Pin 3-Cathode of
Triode No.2
Pin 4-Grid of
Triode No.1



Pin 5-Plate of
Triode No.1
Pin 6-Cathode of
Triode No.1
Pin 7-Heater
Pin 8-Heater

(continued on next page)

MAR. 15, 1948

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA

5691



5691

HIGH-MU TWIN TRIODE

INDUSTRIAL SERVICE*Includes applications such as dc and audio amplifiers**Values are for each unit***Maximum Ratings, Absolute Values:**

DC PLATE VOLTAGE	275 max.	volts
DC PLATE-SUPPLY VOLTAGE.	330 max.	volts
GRID VOLTAGE:		
Negative bias range. 1 [•] min. to	100 max.	volts
Negative peak value.	200 max.	volts
DC GRID CURRENT.	2 max.	ma
DC CATHODE CURRENT	10 max.	ma
PLATE DISSIPATION.	1 max.	watt
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode. .	100 max.	volts
Heater positive with respect to cathode. .	100 max.	volts
AMBIENT TEMPERATURE RANGE.	-55 to +90	°C

- For resistance-coupled amplifier applications, the negative bias may be as low as 0.5 volt.

Maximum Circuit Value (for any operating condition):

Grid-Circuit Resistance.	2 max.	megohms
----------------------------------	--------	---------

Characteristics and Range Values:*Heater Volts, 6.3; Plate Volts, 250; Grid Volts, -2*

	<u>Min.</u>	<u>Avg.</u>	<u>Max.</u>	
Heater Current	0.55	0.6	0.65	amp
Heater-Cathode Current with heater-cathode voltage of ± 100 volts.	—	—	5	μamp
Plate Current.	1.7	2.3	2.9	ma
Difference in Plate Current between triode units	—	—	0.9	ma
Plate Current for grid volt- age of -5.5 volts.	—	—	15	μamp
Reverse Grid Current	—	—	0.2	μamp
Amplification Factor	60	70	80	
Plate Resistance	—	44000	—	ohms
Transconductance	1300	1600	1900	μmhos

Typical Operation as Resistance-Coupled Amplifier (Each Unit)

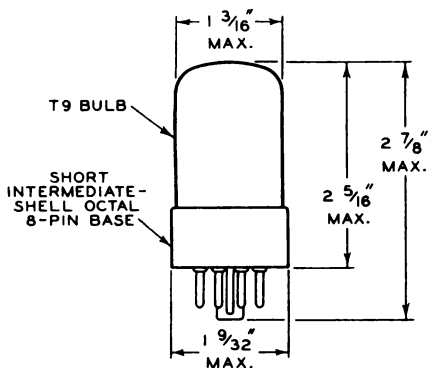
*See RESISTANCE-COUPLED AMPLIFIER CHART No. 7 at front of
Receiving Tube Section.*



5691

HIGH-MU TWIN TRIODE

5691



MAR. 15, 1948

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

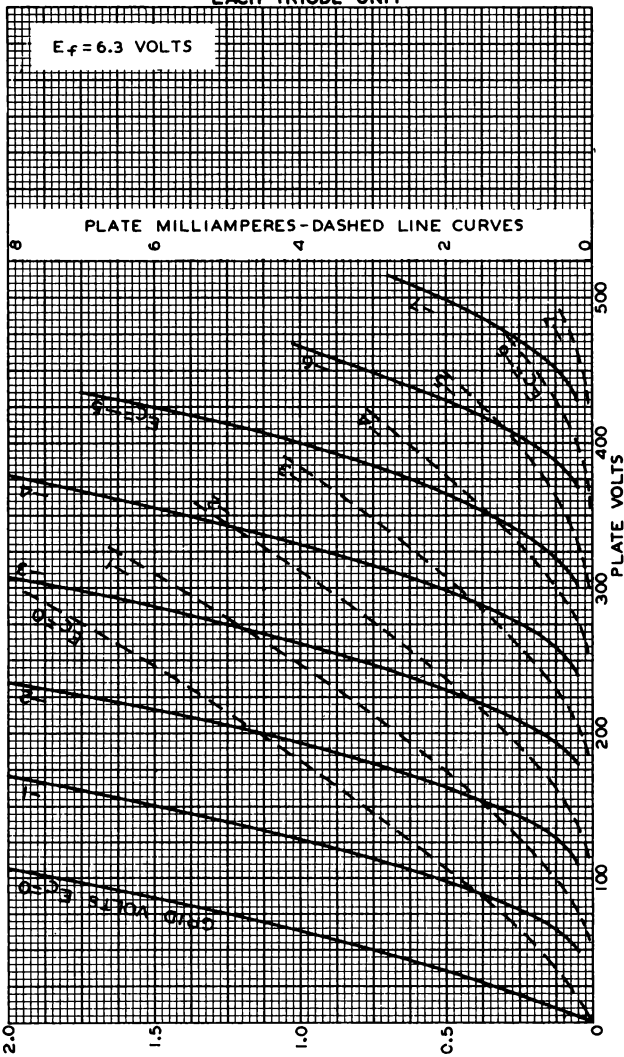
OUTLINE

5691



5691

AVERAGE PLATE CHARACTERISTICS EACH TRIODE UNIT



JUNE 16, 1941

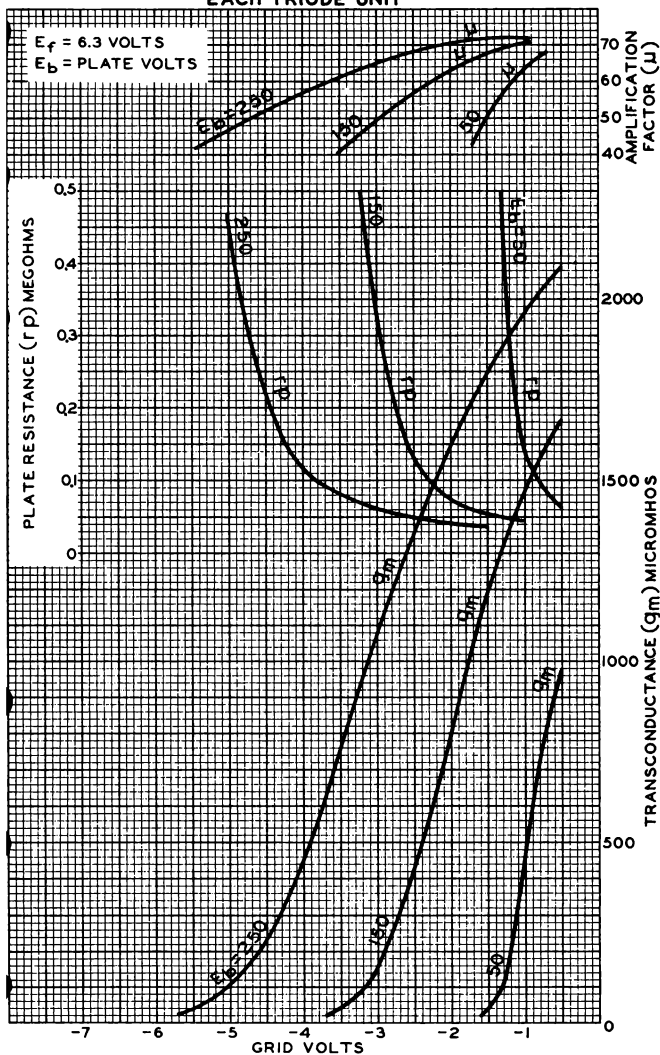
TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92C-6298



569I

569I

AVERAGE CHARACTERISTICS
EACH TRIODE UNIT

NOV. 21, 1947

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6913



5692

MEDIUM-MU TWIN TRIODE**5692
SPECIAL
TUBE RED**

Intended for critical industrial applications where 10,000-hour life, extreme uniformity, rigid construction, and exceptional stability are paramount. Within its ratings, the 5692 may be used to replace its receiving-tube counterpart, type 6SN7-GT.

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathodes:

Voltage. $6.3 \pm 5\%$ * . . . ac or dc volts

Current. 0.6 amp

Direct Interelectrode Capacitances:^o

Triode No.1:	<u>Min.</u>	<u>Av.</u>	<u>Max.</u>	
Grid to Plate.	3.0	3.5	4.0	μf
Grid to Cathode.	1.8	2.3	2.8	μf
Plate to Cathode	2.0	2.5	3.0	μf

Triode No.2:				
Grid to Plate.	2.8	3.3	3.8	μf
Grid to Cathode.	2.1	2.6	3.1	μf
Plate to Cathode	2.2	2.7	3.2	μf

Plate of Triode No.1 to				
Plate of Triode No.2	0.27	0.32	0.37	μf

* Heater voltage may deviate $\pm 10\%$ from rated value, provided such deviation occurs for less than 2% of the operating time.

^o With no external shield.

Mechanical:

Mounting Position. Any

Maximum Overall Length 2-7/8"

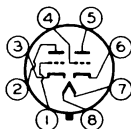
Maximum Seated Length. 2-5/16"

Maximum Diameter 1-9/32"

Bulb T-9

Base Short Intermediate-Shell Octal
8-Pin, Non-Hygroscopic

Basing Designation for BOTTOM VIEW 8BD

Pin 1-Grid of
Triode No.2Pin 2-Plate of
Triode No.2Pin 3-Cathode of
Triode No.2Pin 4-Grid of
Triode No.1Pin 5-Plate of
Triode No.1Pin 6-Cathode of
Triode No.1

Pin 7-Heater

Pin 8-Heater

(continued on next page)

MAR. 15, 1948

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA

5692



5692

MEDIUM-MU TWIN TRIODE

INDUSTRIAL SERVICE

Including applications such as dc amplifiers, audio amplifiers,
and relaxation oscillators.

Values are for each unit

Maximum Ratings, Absolute Values:

DC PLATE VOLTAGE	275 max.	volts
DC PLATE-SUPPLY VOLTAGE.	330 max.	volts
GRID VOLTAGE:		
Negative bias range.	1* min. to 100 max.	volts
Negative peak value.	200 max.	volts
DC GRID CURRENT.	2 max.	ma
DC CATHODE CURRENT	15 max.	ma
PLATE DISSIPATION.	1.75 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode. .	100 max.	volts
Heater positive with respect to cathode. .	100 max.	volts
AMBIENT TEMPERATURE RANGE.	-55 to +90	°C

- * For resistance-coupled amplifier applications, the negative bias may be as low as 0.5 volt.

Maximum Circuit Value (for any operating condition):

Grid-Circuit Resistance.	2 max.	megohms
----------------------------------	--------	---------

Characteristics and Range Values:

Heater Volts, 6.3; Plate Volts, 250; Grid Volts, -9

	<u>Min.</u>	<u>Av.</u>	<u>Max.</u>	
Heater Current	0.55	0.6	0.65	amp
Heater-Cathode Current with heater-cathode voltage of ± 100 volts.	-	-	5	μamp
Plate Current.	4.8	6.5	8.2	ma
Difference in Plate Current between triode units	-	-	2.0	ma
Plate Current for grid volt- age of -24 volts	-	-	15	μamp
Reverse Grid Current	-	-	0.2	μamp
Amplification Factor	18	20	22	
Plate Resistance	-	9100	-	ohms
Transconductance	1825	2200	2575	μmhos

Typical Operation as Resistance-Coupled Amplifier (Each Unit)

See RESISTANCE-COUPLED AMPLIFIER CHART No. 13 at front of
Receiving Tube Section.

OUTLINE DIMENSIONS for the 5692 are the same
as those shown for type 5691

MAR. 15, 1948

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

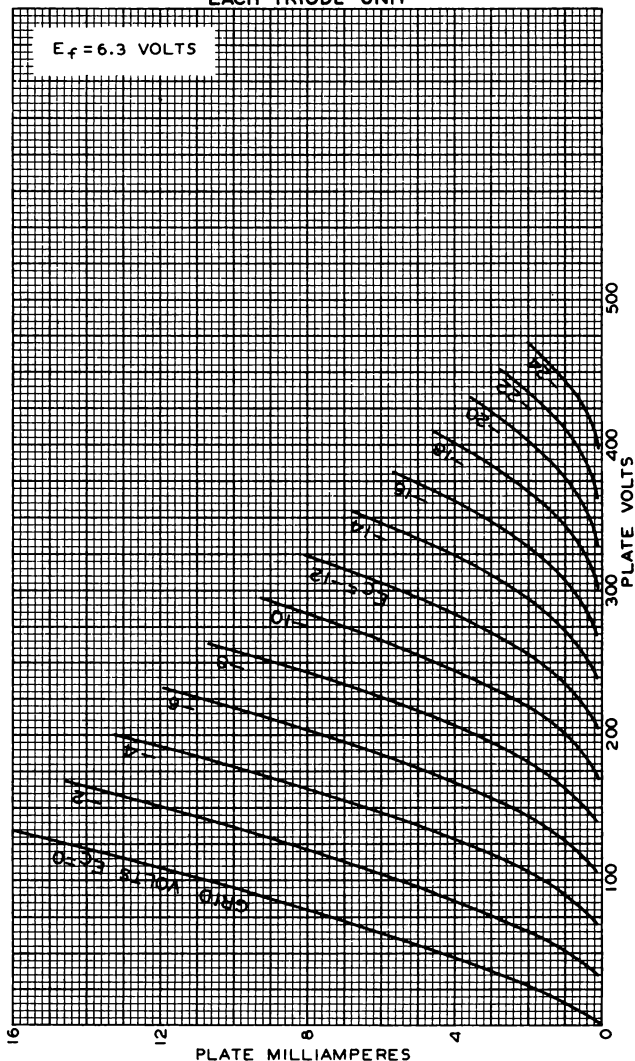
TENTATIVE DATA



5692

5692

AVERAGE PLATE CHARACTERISTICS EACH TRIODE UNIT



FEB. 21, 1941

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

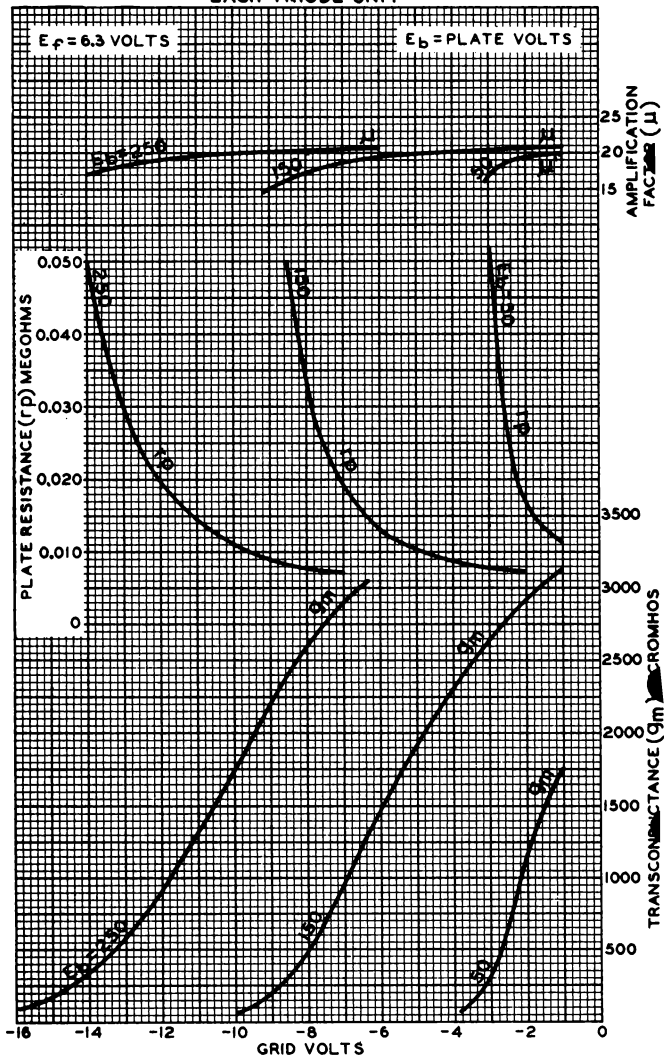
92CM-6257

5692



5692

AVERAGE CHARACTERISTICS EACH TRIODE UNIT



NOV. 10, 1947

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6914



5693

5693
SPECIAL RED
TUBE**SHARP-CUTOFF PENTODE**

Intended for critical industrial applications where 10,000-hour life, extreme uniformity, rigid construction, and exceptional stability are paramount. Within its ratings, the 5693 may be used to replace its receiving-tube counterpart, type 6SJ7.

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathode:

Voltage. $6.3 \pm 5\%$ * . . . ac or dc volts

Current. 0.3 amp

Direct Interelectrode Capacitances:^o

	<u>Min.</u>	<u>Au.</u>	<u>Max.</u>	
Grid to Plate.	—	—	0.005	μmf
Input.	4.8	5.3	5.8	μmf
Output	5.6	6.2	6.8	μmf

* May deviate $\pm 10\%$ from rated value provided such deviation occurs for less than 2% of the operating time.

^o With shell connected to cathode.

Mechanical:

Mounting Position. Any

Maximum Overall Length 2-5/8"

Seated Length. $1-31/32" \pm 3/32"$

Maximum Diameter 1-5/16"

Bulb Metal Shell MT-8

Base Small-Wafer Octal 8-Pin,

Non-Hygroscopic

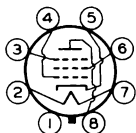
Basing Designation for BOTTOM VIEW 8N

Pin 1—Shell

Pin 2—Heater

Pin 3—Grid No.3

Pin 4—Grid No.1



Pin 5—Cathode

Pin 6—Grid No.2

Pin 7—Heater

Pin 8—Plate

INDUSTRIAL SERVICE

Includes applications such as dc and resistance-coupled amplifiers

Maximum Ratings, Absolute Values:

DC PLATE VOLTAGE 300 max. volts

DC PLATE-SUPPLY VOLTAGE. 330 max. volts

DC GRID-No.3 (SUPPRESSOR) VOLTAGE:

Negative bias value. $\begin{cases} 0 \text{ min. volts} \\ -100 \text{ max. volts} \end{cases}$

DC GRID-No.2 (SCREEN) VOLTAGE[▲] 125 max. volts

DC GRID-No.2-SUPPLY VOLTAGE. 330 max. volts

[▲]: See next page.

MAR. 15, 1948

TUBE DEPARTMENT

TENTATIVE DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5693



5693

SHARP-CUTOFF PENTODE

GRID-No.1 (CONTROL-GRID) VOLTAGE:

Negative bias range.	-1 ¹ min. to -50 max.	volts
Negative peak value.	-50 max.	volts
DC CATHODE CURRENT	10 max.	ma
PLATE DISSIPATION.	2 max.	watts
GRID-No.2 DISSIPATION.	0.3 max.	watt

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode.	100 max.	volts
Heater positive with respect to cathode.	100 max.	volts
AMBIENT TEMPERATURE RANGE.	-55 to +90	°C

Maximum Circuit Value:

See curve on a following page giving maximum values of the grid-No.1 resistor.

Characteristics and Range Values:

Heater volts, 6.3; Plate Volts, 250; Grid-No.3 Volts, 0;
Grid-No.2 Volts, 100; Grid-No.1 Volts, -3.

	<u>Min.</u>	<u>Au.</u>	<u>Max.</u>	
Heater Current	0.275	0.300	0.325	amp
Heater-Cathode Current with heater-cathode voltage of ± 100 volts	-	-	5	μ amp
Plate Current.	2.3	3.0	3.7	ma
Plate Current for grid-No.1 voltage of -7.5 volts. . .	2	30	80	μ amp
Plate Current for grid-No.3 voltage of -70 volts . . .	150	450	750	μ amp
Grid-No.2 Current.	0.60	0.85	1.10	ma
Reverse Grid-No.1 Current. .	-	-	0.1	μ amp
Plate Resistance	1.0	-	-	megohm
Transconductance	1400	1650	1900	μ mhos

Typical Operation as Resistance-Coupled Amplifier:

See RESISTANCE-COUPLED AMPLIFIER CHART No.20 at front
of Receiving Tube Section.

- ▲ The 5693 may be operated at a grid-No.2 voltage as high as the rated grid-No.2 supply voltage when the grid-No.2 dissipation rating is not exceeded for any signal condition and when a resistor is used in series with grid-No.2 and its supply voltage.
- For resistance-coupled amplifier applications, the grid-No.1 negative bias may be as low as -0.5 volt.

MAR. 15, 1948

TUBE DEPARTMENT

TENTATIVE DATA

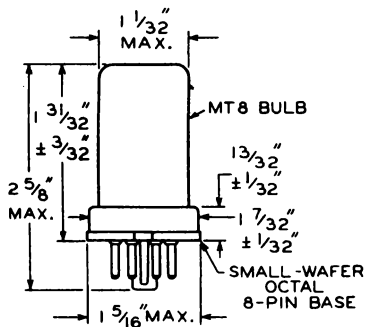
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



5693

SHARP-CUTOFF PENTODE

5693



MAR. 15, 1948

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

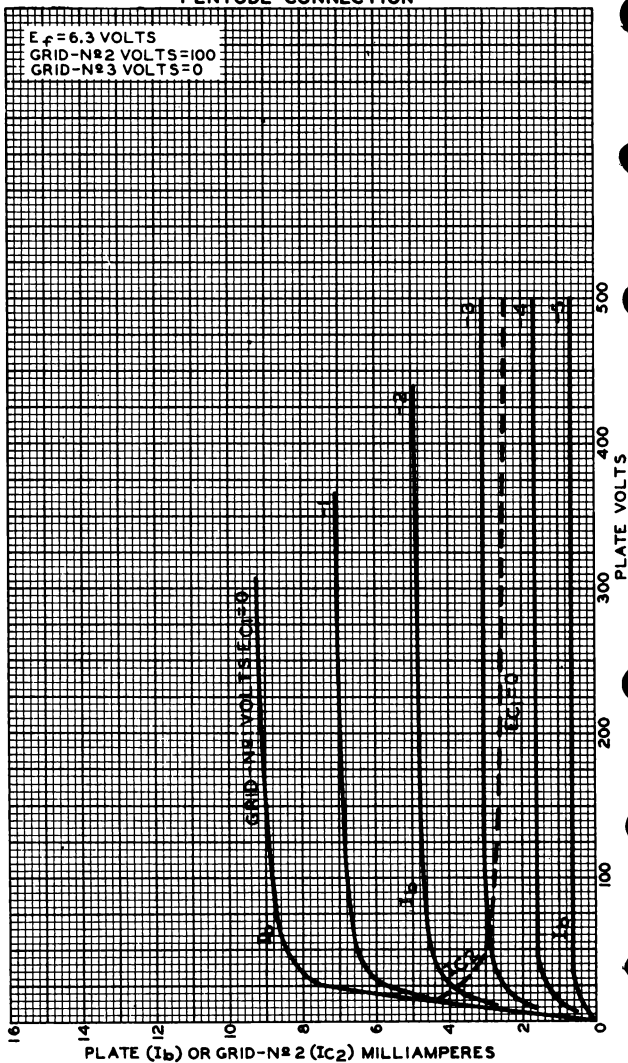
OUTLINE

5693



5693

AVERAGE PLATE CHARACTERISTICS PENTODE CONNECTION



OCT. 16, 1947

TUBE DEPARTMENT

92CM-4939R1

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



5693

5693

OPERATION CHARACTERISTICS

 $E_f = 6.3$ VOLTS

PLATE VOLTS = 300

GRID-Nº 3 VOLTS = 0

CURVE	GRID-Nº 2 RESISTOR	GRID-Nº 2 SUPPLY VOLTS
1	0 MEG.	100
2	0.25 MEG.	300
3	0.5 MEG.	300
4	0.75 MEG.	300

THESE CURVES ARE BASED ON THE FOLLOWING VALUES:

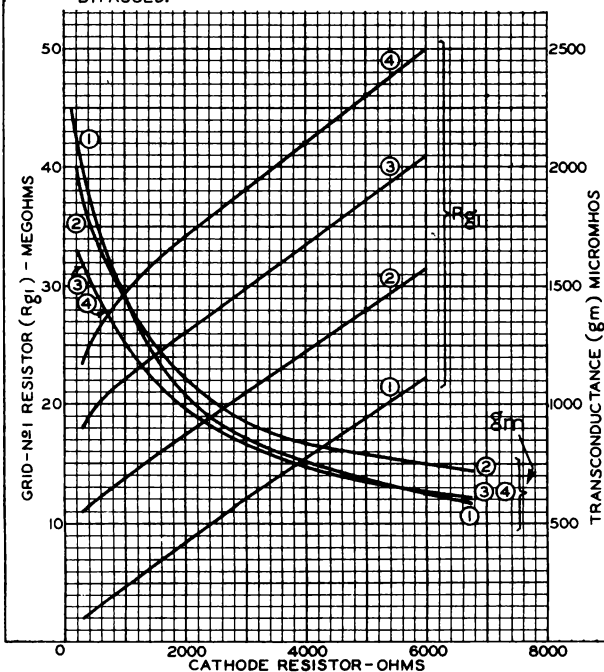
 $\Delta I_k = 300 \mu\text{AMP}$, $\Delta I_{g1} = 0.1 \mu\text{AMP}$

EXPRESSING THESE VALUES AS A RATIO, WE HAVE:

$$\frac{\Delta I_k}{\Delta I_{g1}} = \frac{300}{0.1} \text{ OR } 3000$$

FOR THOSE APPLICATIONS PERMITTING OTHER VALUES OF ΔI_k , A NEW RATIO OF $\Delta I_k / \Delta I_{g1}$ CAN BE CALCULATED. THE VALUES OF R_{g1} AS READ FROM THE CURVE MUST BE MULTIPLIED BY A FACTOR WHICH IS THE QUOTIENT OF THE NEW RATIO DIVIDED BY THE OLD RATIO. FOR EXAMPLE, IF THE NEW RATIO IS 6000 THE MULTIPLYING FACTOR IS $6000/3000$, OR 2, AND VALUES OF R_{g1} AS READ FROM THE CURVE ARE THEREFORE MULTIPLIED BY 2.

NOTE: TRANSCONDUCTANCE CURVES WERE OBTAINED WITH GRID-Nº 2 RESISTOR AND CATHODE RESISTOR SUITABLY BYPASSED.



JAN. 6, 1948

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6920RI

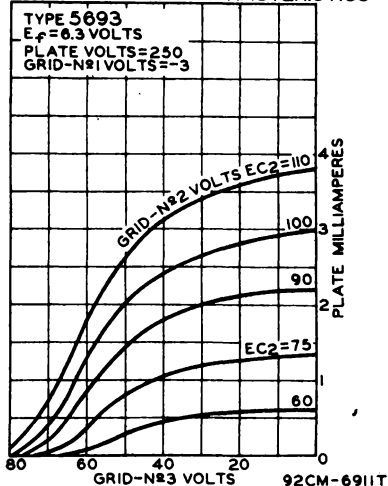
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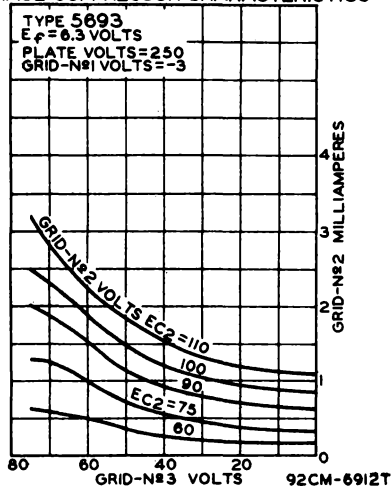
5693

SHARP-CUTOFF PENTODE

AVERAGE SUPPRESSOR CHARACTERISTICS



AVERAGE SUPPRESSOR CHARACTERISTICS



MAR. 15, 1948

TUBE DEPARTMENT

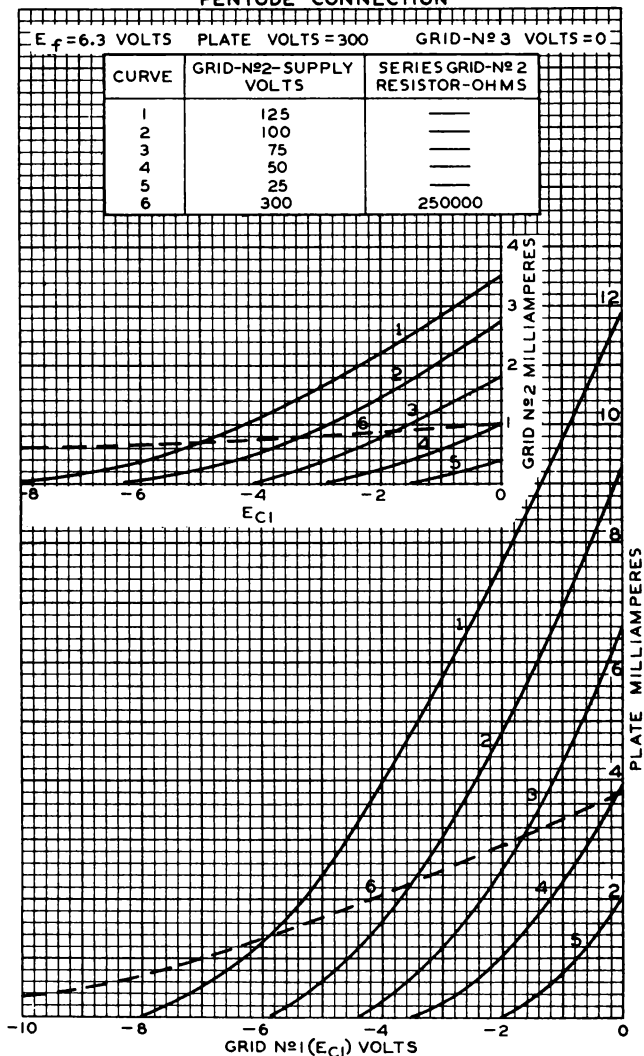
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-6911T-6912T



5693

5693

AVERAGE CHARACTERISTICS
PENTODE CONNECTION

MARCH 5, 1948

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6443RI

5693



5693

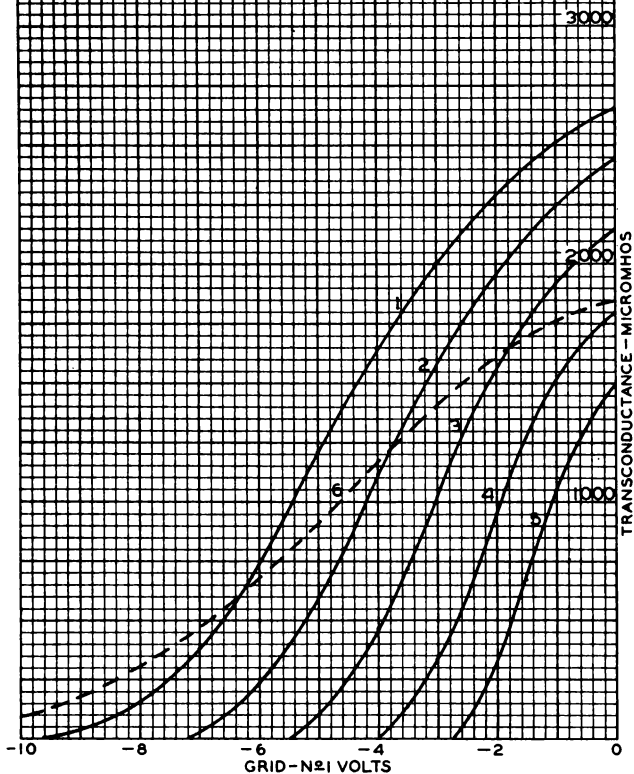
AVERAGE CHARACTERISTICS PENTODE CONNECTION

 $E_f = 6.3$ VOLTS

PLATE VOLTS = 300

GRID-N₃ VOLTS = 0

CURVE	GRID-N ₂ -SUPPLY VOLTS	SERIES GRID-N ₂ RESISTOR-OHMS
1	125	—
2	100	—
3	75	—
4	50	—
5	25	—
6	300	250000



MARCH 5, 1948

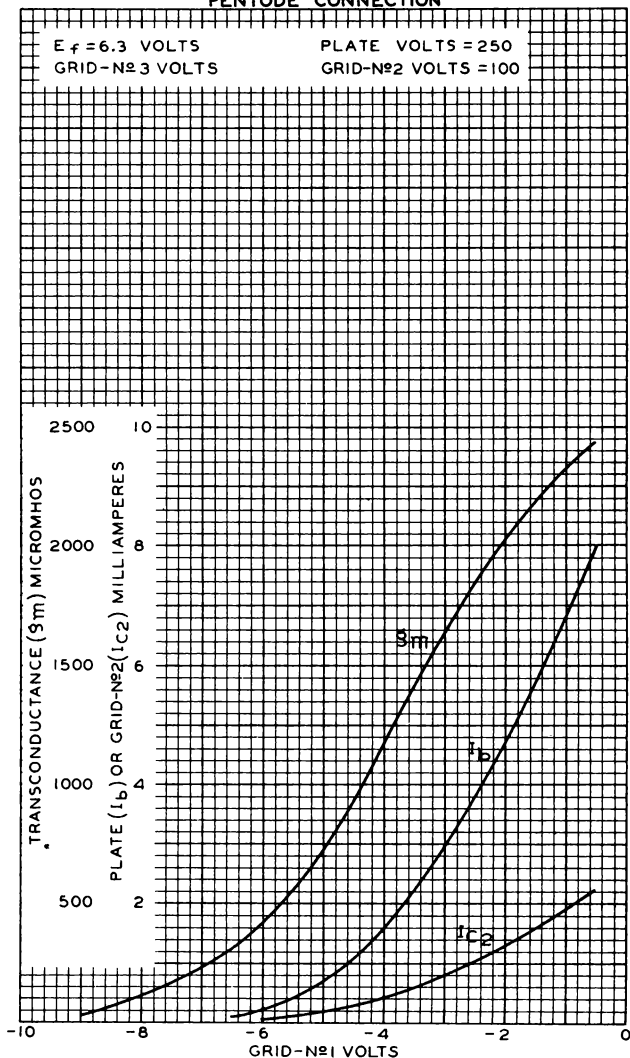
TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6444RI



5693

5693

AVERAGE CHARACTERISTICS
PENTODE CONNECTION

MARCH 5, 1948

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-4937R1



5718

MEDIUM-MU TRIODE

SUBMINIATURE TYPE

*Intended for applications where dependable performance
under shock and vibration is paramount.*

**5718
PREMIUM
TYPE**
GENERAL DATA**Electrical:**

Heater, for Unipotential Cathode:

Voltage $6.3 \pm 5\%$ ac or dc volts

Current 0.150 amp

Direct Interelectrode Capacitances:

	With Exter- nal Shield ^o	Without Exter- nal Shield	
Grid to Plate	1.3	1.4	μf
Input	2.4	2.2	μf
Output	2.4	0.7	μf

^o Having inside diameter of 0.405" and connected to lead No.5.**Characteristics, Class A₁ Amplifier:**

Plate Supply Voltage. . .	100	150	volts
Cathode Resistor	150	180	ohms
Amplification Factor . .	27	27	
Plate Resistance	4650	4150	ohms
Transconductance	5800	6500	μmhos
Plate Current	8.5	13.0	ma
Grid Volts (Approx.) for plate current of 10 μamp	-7	-11	volts

Mechanical:

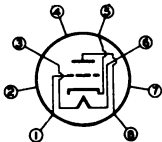
Operating Position	Any
Maximum Bulb Length	1-3/8"
Length from Button Seal to Bulb Top (Excluding tip)	1.075" $\pm$ 0.060"
Diameter	0.383" $\pm$ 0.017"
Bulb	T-3
Leads, Flexible	8
Length	1-1/2" to 1-3/4"
Orientation and Diameter	See Dimensional Outline

BOTTOM VIEW

Lead No.1-Grid

Lead No.2-No
Conn.

Lead No.3-Heater

Lead No.4-No
Conn.

Lead No.5-Cathode

Lead No.6-Heater

Lead No.7-No
Conn.

Lead No.8-Anode

AMPLIFIER - Class A₁**Maximum Ratings, Absolute Values:**

DC PLATE VOLTAGE. 165 max. volts

APRIL 1, 1953

TUBE DEPARTMENT

TENTATIVE DATA 1

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



MEDIUM-MU TRIODE

PLATE DISSIPATION	3.3 max. watts
PEAK HEATER-CATHODE VOLTAGE:	
Heater negative with respect to cathode	200 max. volts
Heater positive with respect to cathode	200 max. volts
BULB TEMPERATURE (At hottest point on bulb surface)	250 max. °C

Typical Operation as Resistance-Coupled Amplifier:

*See RESISTANCE-COUPLED AMPLIFIER CHART
at end of tabulated data for this type*

Maximum Circuit Values:

Grid-Circuit Resistance:

For cathode-bias operation	1.2 max. megohms
For fixed-bias operation	Not recommended

Cathode-Bias Resistance—An adequate value of cathode-bias resistor should be used to protect the tube in event of temporary failure of excitation and resultant loss in developed bias.

RF AMPLIFIER and OSCILLATOR - Class C

Operation with full input is permissible up to 1000 Mc.

Maximum Ratings, Absolute Values:

DC PLATE VOLTAGE	165 max. volts
DC GRID VOLTAGE	-55 max. volts
DC PLATE CURRENT	22 max. ma
DC GRID CURRENT	5.5 max. ma
PLATE DISSIPATION	3.3 max. watts
PEAK HEATER-CATHODE VOLTAGE:	
Heater negative with respect to cathode	200 max. volts
Heater positive with respect to cathode	200 max. volts
BULB TEMPERATURE (At hottest point on bulb surface)	250 max. °C

Maximum Circuit Values:

Grid-Circuit Resistance:

For cathode-bias operation	1.2 max. megohms
For fixed-bias operation	Not recommended

Cathode-Bias Resistance—An adequate value of cathode-bias resistor should be used to protect the tube in event of temporary failure of excitation and resultant loss in developed bias.



5718

5718

MEDIUM-MU TRIODE

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN*

	Note	Min.	Max.	
Heater Current	1	0.138	0.162	amp
Grid-to-Plate Capacitance . .	2	1.1	1.8	μ if
Input Capacitance	2	1.6	2.8	μ if
Output Capacitance	2	0.5	0.9	μ if
Amplification Factor	1,3	23	31	
Plate Current	1,3	6.0	11.0	ma
Plate Current	1,4	—	100	μ amp
Transconductance	1,3	4800	6800	μ hos
Transconductance	5,3	4500	—	μ hos
Grid Current	1,6	—	± 0.4	μ amp
Heater-Cathode Leakage Current:				
Heater negative with respect to cathode	1,7	—	7.0	μ amp
Heater positive with respect to cathode	1,7	—	7.0	μ amp
Leakage Resistance:				
Between Grid and All Other Electrodes Tied . .	1,8	100	—	megohms
Between Plate and All Other Electrodes Tied . .	1,9	100	—	megohms
Useful Power Output	1,10	600	—	mw

* Each tube is stabilized before characteristics testing by continuous operation for at least 45 hours at room temperature and with dissipation values equivalent to life test conditions.

Note 1: With 6.3 volts ac or dc on heater.

Note 2: With external shield.

Note 3: With dc plate supply voltage of 100 volts, cathode resistor of 150 ohms, and cathode bypass capacitor of 1000 microfarads.

Note 4: With dc plate voltage of 100 volts, and dc grid voltage of -7 volts.

Note 5: With 5.5 volts ac or dc on heater.

Note 6: With dc plate supply voltage of 100 volts, cathode resistor of 150 ohms, and grid resistor of 0.5 megohm.

Note 7: With 100 volts dc between heater and cathode.

Note 8: With grid 100 volts negative with respect to all other electrodes tied together.

Note 9: With plate 300 volts negative with respect to all other electrodes tied together.

Note 10: In self-excited oscillator with dc plate voltage of 150 volts, grid resistor and feedback optimized to give useful power output at a plate current of 20 ma. and frequency of 500 Mc.

SPECIAL RATINGS & PERFORMANCE DATA

Shock Rating:

Impact Acceleration 450 max. g

Tubes are held rigid in three different positions in a Navy Type, High Impact (flyweight) Shock Machine and are subjected to 450 g impact acceleration.

APRIL 1, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA 2

5718



5718

MEDIUM-MU TRIODE

Fatigue Rating:

Vibrational Acceleration 2.5 max. g
 Tubes are rigidly mounted and subjected in each of three positions to 2.5 g vibrational acceleration at 25 cycles per second for 32 hours.

Uniform Acceleration Rating 1000 max. g

Tubes are subjected in each of three positions to a gradually applied uniform acceleration up to 1000 g.

High-Frequency Vibration Performance:

RMS Output Voltage 60 max. mv
 Under the following conditions: A 100-volt plate and grid-No.2 voltage supply having an impedance not exceeding that of a 40- μ f capacitor, plate load resistance of 10000 ohms, grid-No.1 resistor of 0.1 megohm, cathode resistor of 150 ohms, cathode bypass capacitor of 1000 μ f, and vibrational acceleration of 15 g at 40 cps.

Heater-Cycling Life Performance:

Cycles of Intermittent Operation . . 2500 max. cycles
 Under the following conditions: With heater voltage of 7.0 volts cycled 1 minute on and 4 minutes off, heater-cathode voltage of 140 volts (rms), and plate, grid-No.2, and grid-No.1 voltage = 0 volts.

Average Life Performance:

The average life performance based on a 500-hour test at 175°C ambient temperature is not less than 450 hours. This life test is made on sample lot of tubes with heater voltage of 6.3 volts; plate supply voltage of 100 volts; grid-No.2 supply voltage of 100 volts; dc heater-cathode voltage (heater positive with respect to cathode) of 200 volts; cathode resistor of 150 ohms; and grid-No.1 resistor of 1 megohm.

The 500-hour end-point limits for the 5840 with heater voltage of 6.3 volts, plate supply voltage of 100 volts, grid-No.2 supply voltage of 100 volts, cathode resistor of 150 ohms bypassed by capacitor having a maximum reactance of 3 ohms, and dc heater-cathode voltage of 100 volts with heater either positive or negative with respect to cathode are: transconductance, 3250 micromhos minimum; heater-cathode leakage current, 20 microamperes maximum; and grid-No.1 current, +0.9 microampere maximum or -0.9 microampere maximum.



5718

5718

MEDIUM-MU TRIODE

OPERATING CONDITIONS AS RESISTANCE-COUPLED AMPLIFIER

Plate-Supply Voltage	100						volts
	0.047		0.10		0.27		meg
Plate Load Resistor							meg
Grid-No.1 Resistor ^o	0.10	0.27	0.27	0.47	0.27	0.47	meg
Cathode Resistor	1000	1200	2200	2700	6800	8200	ohms
Sig. Input Volt. (rms)	0.5	0.5	0.5	0.5	0.5	0.5	volt
Output Voltage (rms)	8.2	8.5	8.2	8.2	7.3	7.4	volts
Voltage Gain [▲]	16.4	17.0	16.4	16.4	14.6	14.8	
Distortion	3.9	3.2	3.0	2.71	3.4	2.8	%
Sig. Input Volt. (rms)*	0.59	0.70	0.67	0.81	0.75	0.86	volt
Output Voltage (rms)	9.7	11.75	11.0	13.1	11.0	12.7	volts
Voltage Gain [▲]	16.4	16.8	16.4	16.2	14.6	14.8	
Distortion	4.5	4.7	4.1	4.6	5.0	5.0	%

Plate-Supply Voltage	200						volts
	0.047		0.10		0.27		meg
Plate Load Resistor							meg
Grid-No.1 Resistor ^o	0.10	0.27	0.27	0.47	0.27	0.47	meg
Cathode Resistor	820	1000	1800	2200	4700	5600	ohms
Sig. Input Volt. (rms)	1.0	1.0	1.0	1.0	1.0	1.0	volt
Output Voltage (rms)	19.0	19.5	18.6	18.1	16.2	16.2	volts
Voltage Gain [▲]	19.0	19.5	18.6	18.1	16.2	16.2	
Distortion	4.0	3.3	3.2	3.1	3.8	3.2	%
Sig. Input Volt. (rms)*	1.23	1.45	1.43	1.56	1.34	1.58	volts
Output Voltage (rms)	23.4	28.0	26.0	28.2	21.6	25.0	volts
Voltage Gain [▲]	19.0	19.3	18.2	18.1	16.1	15.8	
Distortion	5.0	5.0	4.9	5.0	5.1	5.1	%

^o of following stage.[▲] Ratio of signal output to signal input.^{*} Maximum value to swing the grid of resistance-coupled amplifier tube to the point where its grid No.1 starts to draw current.

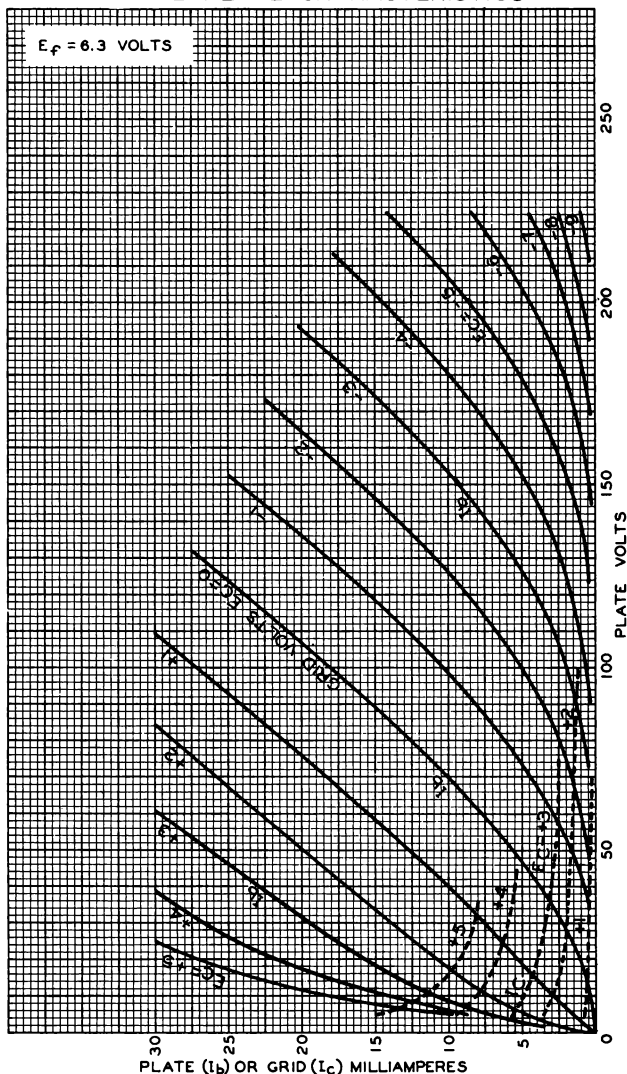
Note: Coupling capacitors should be selected to give desired frequency response. Cathode resistors should be adequately bypassed.

5718



5718

AVERAGE PLATE CHARACTERISTICS



SEPT. 23, 1952

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

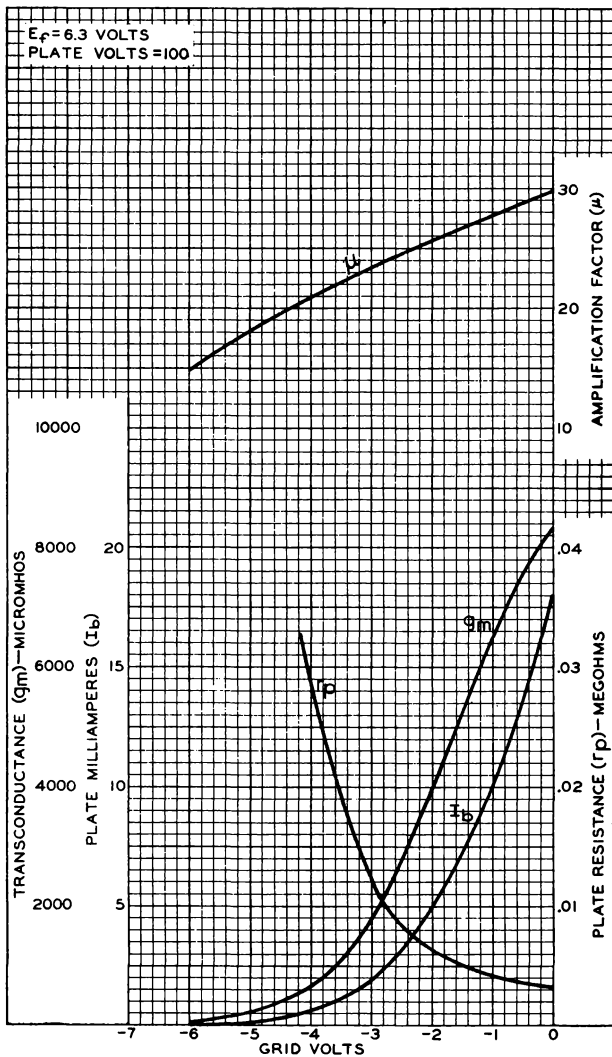
92CM-7648



5718

5718

AVERAGE CHARACTERISTICS



SEPT. 25, 1952

TUBE DIVISION

92CM-7850

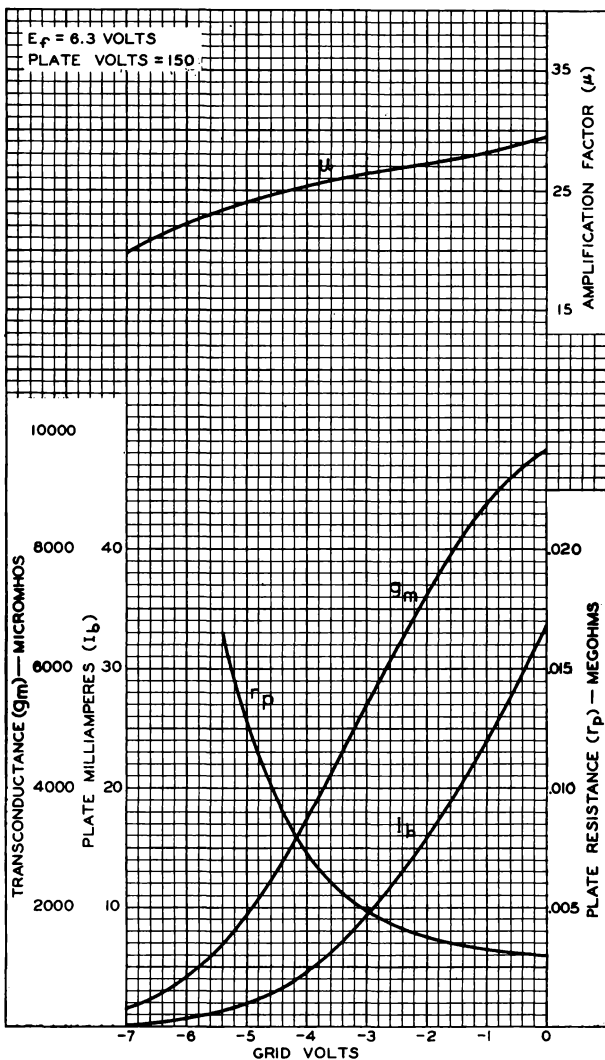
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5718



5718

AVERAGE CHARACTERISTICS



APRIL 22, 1955

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7851RI



5719

HIGH-MU TRIODE

SUBMINIATURE TYPE

5719
PREMIUM TYPE

*Intended for applications where dependable performance
under shock and vibration is paramount.*

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathode:

Voltage 6.3 $\pm$ 5% ac or dc volts

Current 0.150 amp

Direct Interelectrode Capacitances:

	With Exter- nal Shield ⁰	Without Exter- nal Shield	
Grid to Plate	0.8	0.8	μ f
Input	1.9	1.7	μ f
Output	2.2	0.6	μ f

⁰ Having inside diameter of 0.405" and connected to cathode.**Characteristics, Class A₁ Amplifier:**

Plate Supply Voltage . .	100	150	volts
Cathode Resistor	1500	680	ohms
Amplification Factor . .	70	70	
Plate Resistance	41000	30500	ohms
Transconductance	1700	2300	μ hos
Plate Current	0.73	1.85	ma
Grid volts (Approx.) for plate current of 10 μ amp	-2.5	-3.8	volts

Mechanical:

Operating Position	Any
Maximum Bulb Length	1-3/8"
Length from Button Seal to Bulb Top (Excluding tip)	1.075" $\pm$ 0.060"
Diameter	0.383" $\pm$ 0.017"
Bulb	T-3
Leads, Flexible	8
Length	1-1/2" to 1-3/4"
Orientation and Diameter	See Dimensional Outline in GENERAL SECTION

BOTTOM VIEW

Lead No.1-Grid

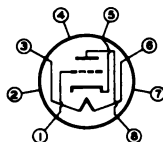
Lead No.2-No

Conn.

Lead No.3-Heater

Lead No.4-No

Conn.



Lead No.5-Cathode

Lead No.6-Heater

Lead No.7-No
Conn.

Lead No.8-Plate

AMPLIFIER - Class A₁**Maximum Ratings, Absolute Values:**

PLATE VOLTAGE 165 max. volts

JUNE 1, 1953

TUBE DEPARTMENT

TENTATIVE DATA 1

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5719



5719

HIGH-MU TRIODE

GRID VOLTAGE	-55 max.	volts
PLATE CURRENT	3.3 max.	ma
PLATE DISSIPATION	0.55 max.	watt
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	200 max.	volts
Heater positive with respect to cathode	200 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	250 max.	°C

Typical Operation as Resistance-Coupled Amplifier:

See RESISTANCE-COUPLED AMPLIFIER CHART
at end of tabulated data for this type

Maximum Circuit Values:

Grid-Circuit Resistance:

For cathode-bias operation	1.2 max.	megohms
For fixed-bias operation	Not recommended	

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN*

	Note	Min.	Max.	
Heater Current	1	0.138	0.162	amp
Grid-to-Plate Capacitance	2	0.6	1.0	μf
Input Capacitance	2	1.2	2.2	μf
Output Capacitance	2	0.4	0.8	μf
Amplification Factor	1,3	60	80	
Plate Current	1,3	0.5	0.9	ma
Plate Current	1,4	-	50	μamp
Transconductance	1,3	1400	2000	μmhos
Transconductance	5,3	1300	-	μmhos
Grid Current	1,6	-	±0.3	μamp
Heater-Cathode Leakage				
Current:				
Heater negative with respect to cathode	1,7	-	7.0	μamp
Heater positive with respect to cathode	1,7	-	7.0	μamp
Leakage Resistance:				
Between Grid and All				
Other Electrodes Tied				
Together	1,8	100	-	megohms
Between Plate and All				
Other Electrodes Tied				
Together	1,9	100	-	megohms

* Each tube is stabilized before characteristics testing by continuous operation for at least 45 hours at room temperature and with dissipation values equivalent to life test conditions.

Note 1: With 6.3 volts ac or dc on heater.

Note 2: Without external shield.

Note 3: With plate supply voltage of 100 volts, cathode resistor of 150 ohms, and cathode bypass capacitor of 1000 microfarads.

JUNE 1, 1953

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA 1



5719

5719

HIGH-MU TRIODE

Note 4: With dc plate voltage of 100 volts, and dc grid voltage of -2.5 volts.

Note 5: With 5.7 volts ac or dc on heater.

Note 6: With plate supply voltage of 100 volts, cathode resistor of 1500 ohms, cathode bypass capacitor of 1000 microfarads and grid resistor of 0.1 megohm.

Note 7: With 100 volts dc between heater and cathode.

Note 8: With grid 100 volts negative with respect to all other electrodes tied together.

Note 9: With plate 300 volts negative with respect to all other electrodes tied together.

SPECIAL RATINGS & PERFORMANCE DATA

Shock Rating:

Impact Acceleration 450 max. g

Tubes are held rigid in three different positions in a Navy Type, High Impact (flyweight) Shock Machine and are subjected to 450 g impact acceleration.

Fatigue Rating:

Vibrational Acceleration 2.5 max. g

Tubes are rigidly mounted and subjected in each of three positions to 2.5 g vibrational acceleration at 25 cycles per second for 32 hours.

Uniform Acceleration Rating: 1000 max. g

Tubes are subjected in each of three positions to a gradually applied uniform acceleration up to 1000 g.

Low-Frequency Vibration Performance:

RMS Output Voltage 25 max. mv

Under the following conditions: A 150-volt plate voltage supply having an impedance not exceeding that of a 40 μ f capacitor, plate load resistance of 10000 ohms, grid resistor of 0.1 megohm, cathode resistor of 1500 ohms, cathode bypass capacitor of 1000 μ f, and vibrational acceleration of 15 g at 40 cps.

Heater-Cycling Life Performance:

Cycles of Intermittent Operation 2500 min. cycles

Under the following conditions: With heater voltage of 7.0 volts cycled 1 minute on and 4 minutes off, heater-cathode voltage of 140 volts (rms), and plate and grid voltage = 0 volts.

Average Life Performance:

The average life performance based on a 500-hour test at 175°C ambient temperature is not less than 450 hours. This life test is made on sample lot of tubes with heater voltage of 6.3 volts; plate supply voltage of 100 volts; dc heater-cathode voltage (heater positive with respect to cathode) of 200 volts; cathode resistor of 1500 ohms; and grid resistor of 1 megohm.

The 500-hour end-point limits for the 5719 with heater voltage of 6.3 volts, plate supply voltage of 100 volts, cathode resistor of 680 ohms bypassed by capacitor having a maximum reactance of 3 ohms, and dc heater-cathode voltage of 100 volts with heater either positive or negative with respect to cathode are: transconductance, 1000 micromhos minimum; heater-cathode leakage current, 20 microamperes maximum; and grid current, +0.9 microampere maximum or -0.9 microampere maximum.

5719



5719

HIGH-MU TRIODE

OPERATING CONDITIONS AS RE-

Cathode-Bias

Plate Supply Voltage

100

Plate Load Resistor

Grid Resistor^o

Cathode Resistor

Signal Input Volts (rms)

Output Volts (rms)

Gain^A

Distortion

Signal Input Volts (rms)*

Output Volts (rms)

Gain^A

Distortion

0.1	0.1	0.27	0.27	0.47
0.27	0.47	0.47	1.0	0.47
2700	2700	5600	6800	10000
0.1	0.1	0.1	0.1	0.1
3.7	3.9	4.1	4.2	3.95
37	39	41	42	39.5
2.4	2.1	2.1	1.8	2.4
0.20	0.20	0.20	0.26	0.20
7.3	7.7	8.1	10.7	7.8
36.5	38.5	40.5	41.2	39
5.0	4.5	4.3	4.9	5.0

Zero-Bias

Plate-Supply Voltage

100

Plate Load Resistor

Grid Resistor^o

Signal Input Volts (rms)

Output Volts (rms)

Gain^A

Distortion

Signal Input Volts (rms)*

Output Volts (rms)

Gain^A

Distortion

0.1	0.1	0.27	0.27	0.47
0.27	0.47	0.47	1.0	0.47
0.1	0.1	0.1	0.1	0.1
3.8	4.0	4.3	4.55	4.2
38	40	43	45.5	42
2.2	2.0	1.9	1.6	2.1
0.2	0.21	0.22	0.26	0.2
7.25	7.9	8.95	11	7.9
36.2	37.6	40.6	42.4	39.5
5.0	4.8	4.9	4.8	4.8

Note 1: Coupling capacitors should be selected to give desired frequency response. Cathode resistor should be adequately bypassed.

^o of following stage.



5719

5719

HIGH-MU TRIODE

RESISTANCE-COUPLED AMPLIFIER

Operation

200								volts
0.47	0.1	0.1	0.27	0.27	0.47	0.47		megohm
1.0	0.27	0.47	0.47	1.0	0.47	1.0		megohm
10000	1500	1800	3300	3900	5600	6800		ohms
0.1	0.1	0.1	0.1	0.1	0.1	0.1		volt
4.3	4.4	4.6	4.9	5.0	4.8	5.0		volts
43	44	46	49	50	48	50		
1.7	0.7	0.7	0.9	0.7	0.9	0.7		per cent
0.25	0.51	0.61	0.50	0.59	0.49	0.64		volt
10.7	22	27	24.2	29	23.2	31.6		volts
42.8	43.1	44.3	48.4	49.2	47.3	49.4		
4.5	3.9	5.0	4.5	4.5	5.0	5.0		per cent

Operation

200								volts
0.47	0.1	0.1	0.27	0.27	0.47	0.47		megohm
1.0	0.27	0.47	0.47	1.0	0.47	1.0		megohm
0.1	0.1	0.1	0.1	0.1	0.1	0.1		volt
4.55	4.7	4.9	5.35	5.4	5.2	5.4		volts
45.5	47	49	53.5	54	52	54		
1.6	0.4	0.4	0.8	0.7	0.9	0.7		per cent
0.27	0.59	0.63	0.54	0.65	0.5	0.63		volt
11.3	25	27.7	25.8	31.5	23.5	30.5		volts
41.8	42.4	43.9	47.7	48.5	47	48.4		
5.0	4.9	5.0	4.9	5.0	5.0	4.8		per cent

* Maximum value to swing the grid of resistance-coupled amplifier tube to the point where its grid starts to draw current.

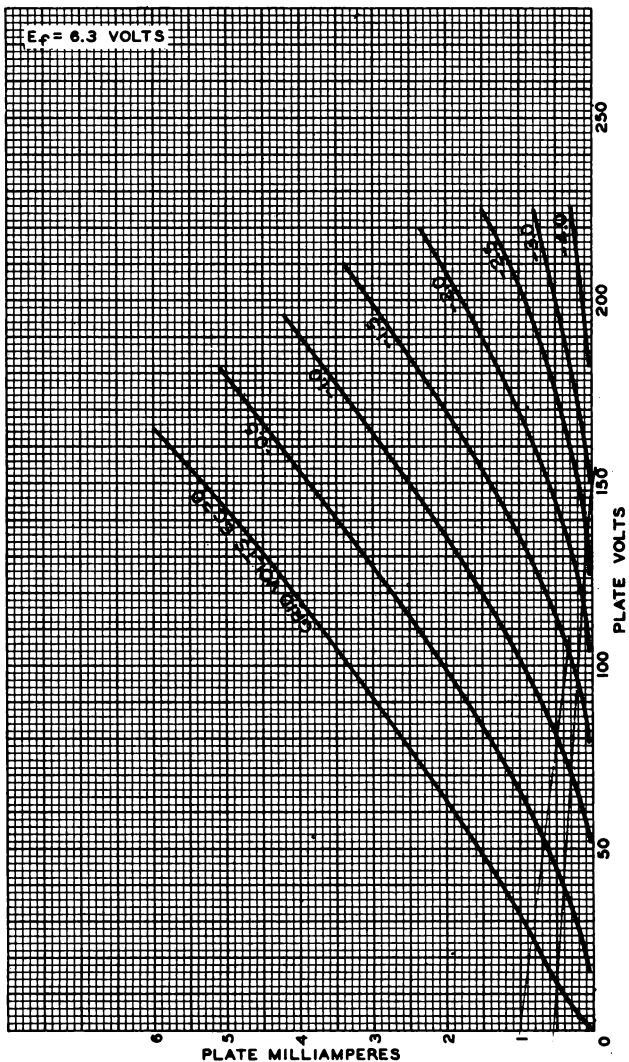
▲ Ratio of signal output to signal input.

5719



5719

AVERAGE PLATE CHARACTERISTICS



FEB. 16, 1953

TUBE DEPARTMENT

92CM-7925

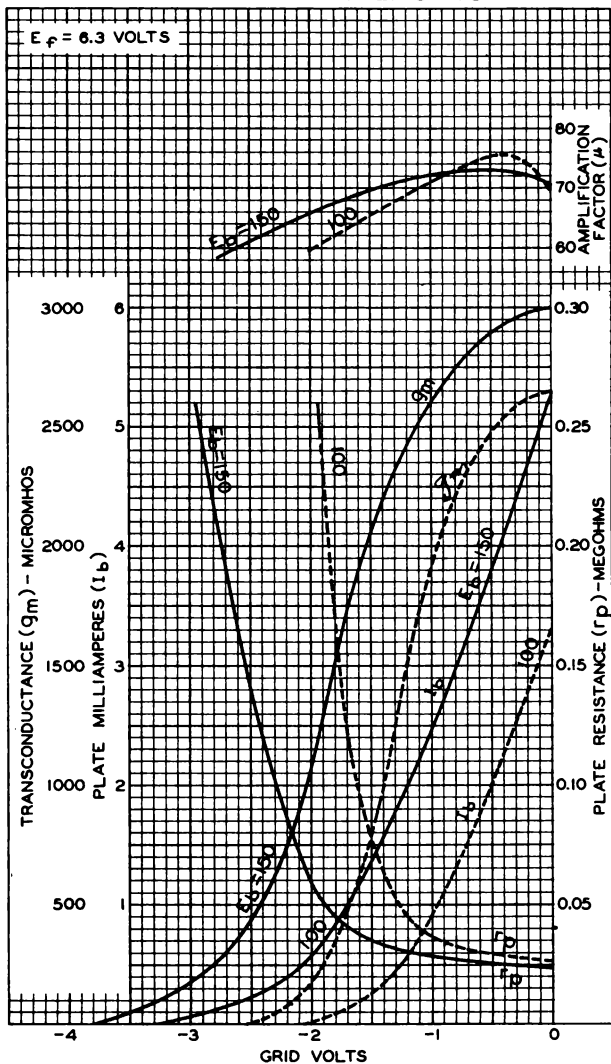
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



5719

5719

AVERAGE CHARACTERISTICS



FEB. 16, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7928



5726

TWIN DIODE

MINIATURE TYPE

5726
PREMIUM TYPE

Intended for applications where dependable performance under shock and vibration is paramount.

The 5726 is a "premium" version of the 6AL5W.

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathodes:

Voltage $6.3 \pm 10\%$ ac or dc volts

Current 0.3 amp

Resonant Frequency (Each unit, approx.) 700 Mc

Direct Interelectrode Capacitances

(With external shield JETEC No.316):

Unit No.1:Plate to Cathode + External Shield,
Heater, and Internal Shield 3.2 μf Cathode to Plate + External Shield,
Heater, and Internal Shield 3.9 μf **Unit No.2:**Plate to Cathode + External Shield,
Heater, and Internal Shield 3.2 μf Cathode to Plate + External Shield,
Heater, and Internal Shield 3.9 μf Plate of Unit No.1 to Plate of Unit No.2* 0.026 max. μf **Mechanical:**

Mounting Position Any

Maximum Overall Length 1-3/4"

Maximum Seated Length 1-1/2"

Length, Base Seat to Bulb Top (Excluding tip) 1-1/8" $\pm$ 3/32"

Maximum Diameter 3/4"

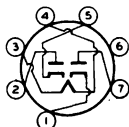
Bulb T-5-1/2

Base Small-Button Miniature 7-Pin (JETEC No.E7-1)

BOTTOM VIEWPin 1 - Cathode of
Diode Unit
No.1Pin 2 - Plate of
Diode Unit
No.2

Pin 3 - Heater

Pin 4 - Heater

Pin 5 - Cathode of
Diode Unit
No.2Pin 6 - Internal
ShieldPin 7 - Plate of
Diode Unit
No.1**HALF-WAVE RECTIFIER****Maximum Ratings, Absolute Values:**

PEAK INVERSE PLATE VOLTAGE 360 max. volts

PEAK PLATE CURRENT PER PLATE 60 max. ma

* With external and internal shield connected to ground.

SEPT. 1, 1952

TUBE DEPARTMENT

TENTATIVE DATA 1

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5726



5726

TWIN DIODE

HOT-SWITCHING TRANSIENT PLATE CURRENT		
For duration of 0.2 second maximum . . .	350 max.	ma
DC OUTPUT CURRENT PER PLATE	10 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	360 max.	volts
Heater positive with respect to cathode	360 max.	volts

Typical Operation:

The two units may be used separately or in parallel

AC Plate-Supply Voltage		
Per Plate (RMS)	117	volts
Minimum Total Effective Plate-Supply		
Impedance Per Plate	300	ohms
DC Output Current Per Plate	9	ma

Shock and Vibration Tests:

These tests are made as indicated in the JAN Specifications: JAN 1-A for Electron Tubes, May 1946 under the section as follows:

Section F6b (9e) Shock Test:		
Instantaneous Impact Acceleration . .	700 max.	g
Section F6b (9f) Vibration Test:		
Vibrational Acceleration	2.5 max.	g

Heater Cycling Life Test:

This test is made as indicated in the JAN Specifications JAN 1-A for Electron Tubes for type 5726/6AL5W.

Cycles of Intermittent Operation:

At a heater voltage of 7.5 volts . . . 2000 min. cycles

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	Min.	Max.	
Heater Current	1	0.275	0.325	amp
Direct Interelectrode				
Capacitances (With external shield JETEC No.316):				
Unit No.1:				
Plate to Cathode+ External Shield, Heater, and Internal Shield	-	2.4	4.0	$\mu\mu\text{f}$
Cathode to Plate+ External Shield, Heater, and Internal Shield	-	2.8	4.4	$\mu\mu\text{f}$
Unit No.2:				
Plate to Cathode+ External Shield, Heater, and Internal Shield	-	2.4	4.0	$\mu\mu\text{f}$
Cathode to Plate+ External Shield, Heater, and Internal Shield	-	2.8	4.4	$\mu\mu\text{f}$

SEPT. 1, 1952

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA 1



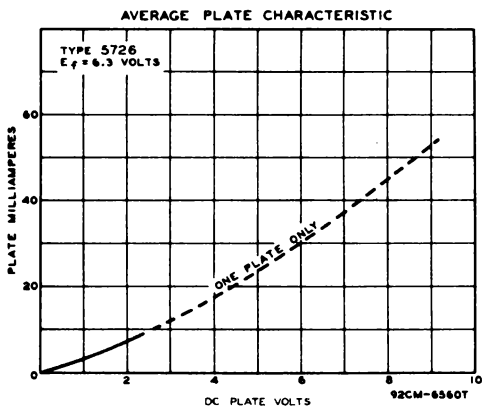
5726

5726

TWIN DIODE

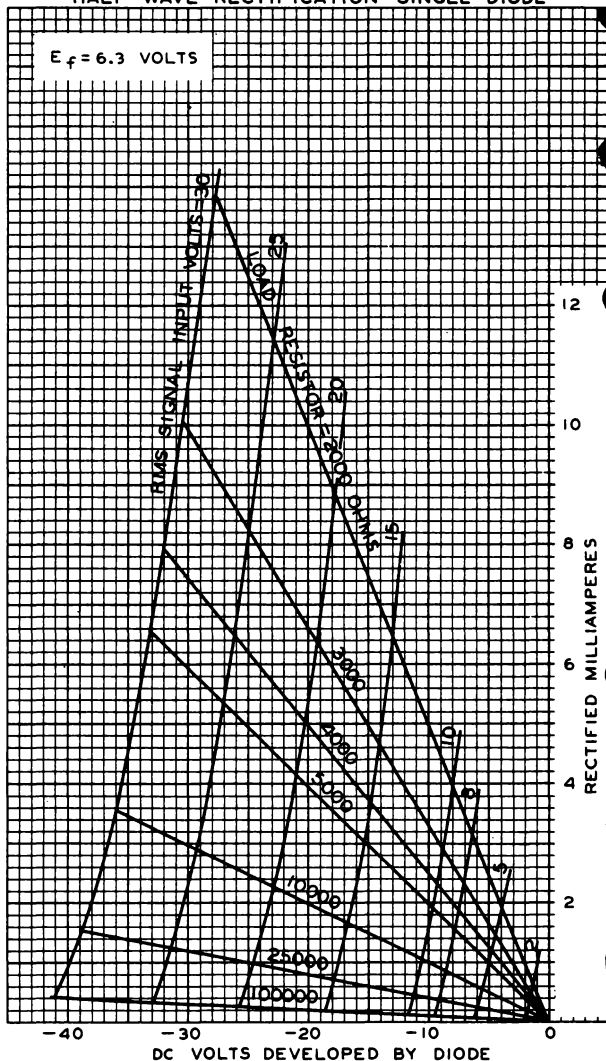
	Note	Min.	Max.	
Plate of Unit No.1 to Plate of Unit No.2	2	-	0.026	μf
Plate Current (Per Plate) . . .	1,3	40	-	ma

Note 1: With 6.3 volts ac on heater.
Note 2: With external and internal shield connected to ground.
Note 3: With dc plate voltage = 10 volts. Each unit tested separately with electrodes of opposite unit grounded.



5726

AVERAGE CHARACTERISTICS HALF-WAVE RECTIFICATION-SINGLE DIODE



JUNE 7, 1944

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6561



5734

MECHANO-ELECTRONIC TRANSDUCER

TRIODE TYPE

5734

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathode:

Voltage. 6.3 ac or dc volts
 Current. 0.15 amp

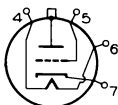
Mechanical:

Mounting Position. Any
 Maximum Angular Deflection of Plate Shaft ± 0.5 degree
 Maximum Overall Length (Excluding flexible leads). . . . 1.300"
 Maximum Diameter 0.328"
 Envelope Metal Shell MT-2-1/4
 Terminal Connections, BOTTOM VIEW

Lead 4 - Heater

Lead 5 - Grid

Lead 6 - Heater



Lead 7 - Cathode,
 Internal
 Shield

Shell - Plate

Maximum Ratings, Design-Center Values:

DC PLATE-SUPPLY VOLTAGE. 300 max. . . volts
 DC PLATE CURRENT 5 max. . . ma
 PLATE DISSIPATION. 0.4 max. . . watt
 PEAK HEATER-CATHODE VOLTAGE:
 Heater negative with
 respect to cathode. 90 max. . . volts
 Heater positive with
 respect to cathode. 90 max. . . volts

Typical Operation:

DC Plate-Supply Voltage. 300 volts
 DC Grid Voltage. 0 volts
 Amplification Factor[▲] 20
 Plate Resistance[▲] 72000 ohms
 Transconductance[▲] 275 micromhos
 DC Plate Current[▲] 1.5 ma
 Load Resistance. 75000 ohms
 Deflection Sensitivity[◆] $\begin{cases} 40 \\ 2300 \end{cases}$ $\begin{cases} \text{volts/degree} \\ \text{volts/radian} \end{cases}$
 Moment of Inertia
 of Plate[●] 3.4 milligram cm²
 Rotational Compliance[●] $\{0.0013 \times 10^{-3}$ radian/dyne cm
 of Diaphragm[●] $\} 0.075$ degree/gram cm

[▲] For plate shaft in undeflected position.

[◆] Average change in voltage across 75000-ohm plate-load resistor when the plate shaft is deflected from -0.5 to $+0.5$ degree.
 The plane of deflection of the plate shaft must coincide with the plane through terminal No. 5 and the axis of the tube.

[●] Based on external plate-shaft length of $1/8$ " and the center of the diaphragm as pivot.

NOV. 15, 1948

TUBE DEPARTMENT
 RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA

5734



5734

MECHANO-ELECTRONIC TRANSDUCER

OPERATING PRINCIPLES

The plate shaft extends through the center of a thin metal diaphragm. Angular displacement of the plate shaft changes the distance between the fixed grid and the plate and results in a change in the plate current. The plane of deflection of the plate shaft coincides with the plane through terminal No. 5 and the axis of the tube.

The part of the plate shaft within the tube has a minimum free cantilever resonance of 12000 cycles per second permitting, with suitable mechanical coupling to the external end of the plate shaft, measurements of vibration up to 12000 cycles per second.

OPERATING NOTES

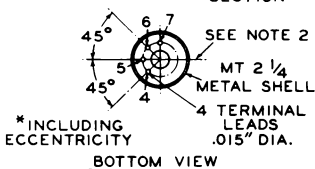
The 5734 may be mounted by means of a supporting clamp which should firmly grip the metal shell of the tube within the designated clamping space indicated on the Outline Drawing. It is essential, however, that the pressure exerted on the shell by the clamp be held to a minimum to prevent possible fracture of the seals.

Under no circumstances should the plate shaft be displaced from its normal position by more than 0.5 degree. A larger displacement of the plate shaft will distort the flexible diaphragm and may damage the tube electrodes.

A non-corrosive flux must be used in soldering the actuating stylus to the plate shaft. Unless this precaution is observed, the plate shaft and the diaphragm will be damaged.



5734

[illegible]

NOTE 2: THE PLANE OF DEFLECTION OF THE PLATE SHAFT WILL COINCIDE WITH THE PLANE THROUGH TERMINAL LEAD No.5 AND THE AXIS OF THE TUBE.

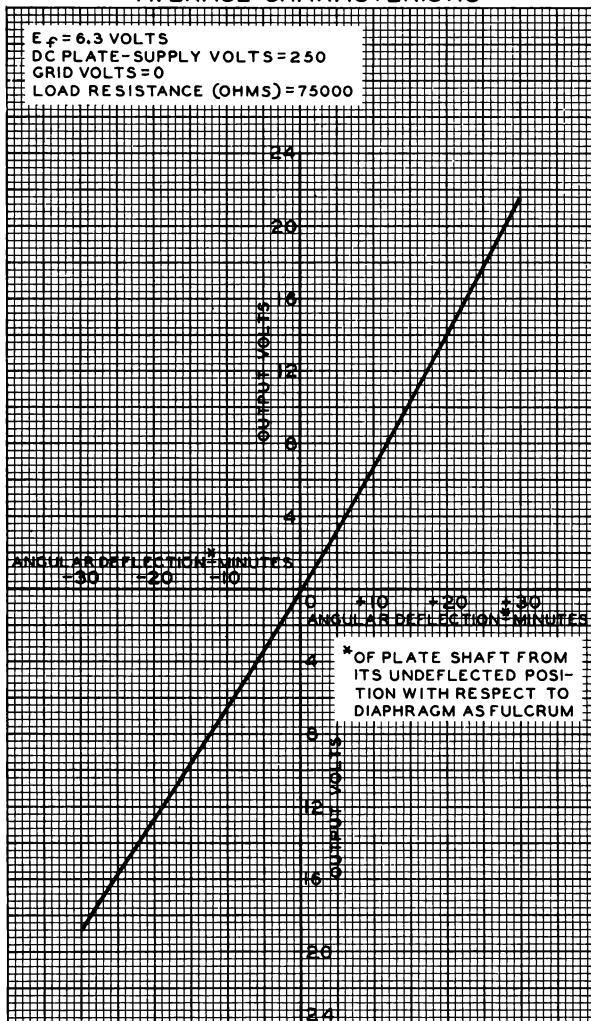
92CS-7036

5734



5734

AVERAGE CHARACTERISTIC



AUG. 13, 1948

 TUBE DEPARTMENT
 RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

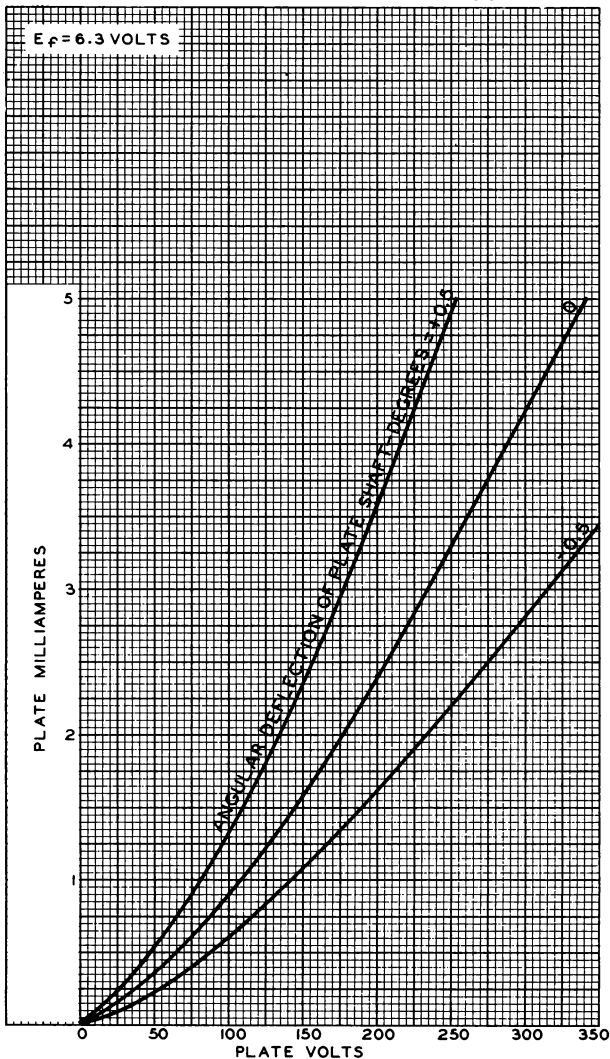
92CM-7055



5734

5734

AVERAGE CHARACTERISTICS



AUG. 17, 1948

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

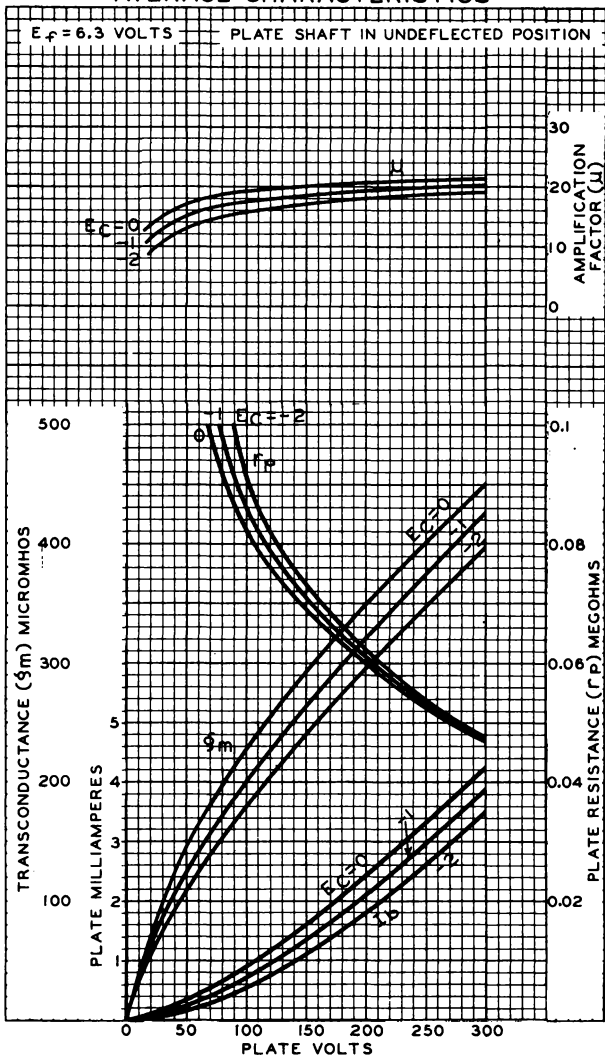
92CM-7059

5734



5734

AVERAGE CHARACTERISTICS



AUG. 17, 1948

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7057



5750

PENTAGRID CONVERTER

7-PIN MINIATURE TYPE

For use as a combined mixer and oscillator tube particularly in mobile and aircraft communications receivers in which dependability is paramount. This "premium" type is similar to the 6BE6.

 5750
 PREMIUM TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage. 6.3 ac or dc volts

Current. 0.3 amp

Direct Interelectrode Capacitances:⁰Grid No.3 to all other electrodes (RF input). 7.1 $\mu\mu\text{f}$ Plate to all other electrodes (Mixer input). 7.6 $\mu\mu\text{f}$ Grid No.1 to all other electrodes (Oscillator input). 5.5 $\mu\mu\text{f}$ Grid No.3 to plate 0.3 max. $\mu\mu\text{f}$ Grid No.3 to grid No.1 0.15 max. $\mu\mu\text{f}$ Grid No.1 to cathode & grid No.5 3 $\mu\mu\text{f}$ Cathode & grid No.5 to all other electrodes except grid No.1. 15 $\mu\mu\text{f}$

Mechanical:

Operating Position Any

Maximum Overall Length 2-1/8"

Maximum Seated Length. 1-7/8"

Length, Base Seat to Bulb Top

(Excluding tip). 1-1/2" $\pm$ 3/32"

Diameter 0.650" to 0.750"

Dimensional Outline. See General Section

Bulb T5-1/2

Base Small-Button Miniature 7-Pin (JEDEC No.E7-1)

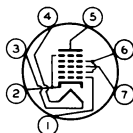
Basing Designation for BOTTOM VIEW 7CH

Pin 1-Grid No.1

Pin 2-Cathode,
Grid No.5

Pin 3-Heater

Pin 4-Heater



Pin 5-Plate

Pin 6-Grid No.2,
Grid No.4

Pin 7-Grid No.3

CONVERTER

Maximum Ratings, Absolute Values:

PLATE VOLTAGE. 330 max. volts

GRID-No.3 (CONTROL-GRID) VOLTAGE:

Negative-bias value. 55 max. volts

Positive-bias value. 0 max. volts

GRIDS-No.2 & No.4 (SCREEN-GRID)

SUPPLY VOLTAGE 330 max. volts

⁰: See next page.

5750



5750

PENTAGRID CONVERTER

GRIDS-No.2 & No.4 VOLTAGE.	110 max.	volts
TOTAL CATHODE CURRENT.	15.5 max.	ma
GRIDS-No.2 & No.4 INPUT.	1.1 max.	watts
PLATE DISSIPATION.	1.1 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect		
to cathode	100 max.	volts
Heater positive with respect		
to cathode	100 max.	volts
BULB TEMPERATURE (At hottest point		
on bulb surface)	165 max.	°C

Characteristics:

With Separate Excitation*

Plate Voltage.	100	250	volts
Grids-No.2 & No.4 Voltage.	100	100	volts
Grid-No.3 Voltage.	-1.5	-1.5	volts
RMS Grid-No.1 (Oscillator-grid)			
Voltage.	10	10	volts
Grid-No.1 Resistor.	20000	20000	ohms
Plate Resistance (Approx.)	0.4	1	megohm
Conversion Transconductance.	455	475	μmhos
Plate Current.	2.6	2.6	ma
Grids-No.2 & No.4 Current.	7.5	7.5	ma
Grid-No.1 Current.	0.5	0.5	ma
Total Cathode Current.	10.6	10.6	ma
Grid-No.3 Voltage (Approx.) for			
conversion transconductance of:			
10 μmhos	-30	-30	volts
100 μmhos.	-6	-6	volts

Oscillator Characteristics (Not Oscillating):†

Plate & Grids-No.2 & No.4 Voltage.	100	volts
Grid-No.3 Voltage.	0	volts
Grid-No.1 Voltage.	0	volts
Amplification Factor§.	22.5	
Oscillator Transconductance§.	7800	μmhos
Cathode Current.	25	ma
Grid-No.1 Voltage (Approx.) for		
plate μa. = 10	-11	volts

° Without external shield.

* The characteristics shown with separate excitation correspond very closely with those obtained in a self-excited oscillator circuit operating with zero bias.

† With grids No.2 & No.4 connected to plate.

§ Between grid No.1 and grids No.2 & No.4 connected to plate.

SPECIAL RATINGS & PERFORMANCE DATA

Shock Rating:

Impact Acceleration.	450 max.	g
This test is performed in a Navy-Type, High-Impact (fly-		



5750

5750

PENTAGRID CONVERTER

weight) Shock Machine.

Fatigue Rating:

Vibrational Acceleration 2.5 max. g

This test is performed for a period of 100 hours minimum at a frequency of 25 cycles per second.

Heater-Cycling Life Performance:

Cycles of Intermittent Operation 2000 min. cycles

Under the following conditions: heater volts = 7.5 cycled one minute on and one minute off, heater 135 volts positive with respect to cathode, and all other elements connected to ground.

CURVES

shown under Type 6BE6 in the Receiving-Tube
Section also apply to the 5750



5751

HIGH-MU TWIN TRIODE

9-PIN MINIATURE TYPE

*Intended for applications where dependable performance
under shock and vibration is paramount*

 5751
PREMIUM TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:

Heater Arrangement	Series	Parallel	
Voltage (AC or DC)	$12.6 \pm 10\%$	$6.3 \pm 10\%$	volts
Current	0.175	0.35	amp

Characteristics, Class A₁ Amplifier:

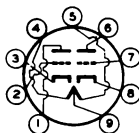
Plate Voltage	100	250	volts
Grid Voltage	-1	-3	volts
Amplification Factor	70	70	
Plate Resistance	58000	58000	ohms
Transconductance	1200	1200	μ mhos
Plate Current	0.9	1.0	ma

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" $\pm$ 3/32"
Maximum Diameter	7/8"
Bulb	T-6-1/2
Base	Small-Button Noval 9-Pin (JETEC No.E9-1)

BOTTOM VIEW

Pin 1 - Plate of
Unit No.2
Pin 2 - Grid of
Unit No.2
Pin 3 - Cathode of
Unit No.2
Pin 4 - Heater
Pin 5 - Heater



Pin 6 - Plate of
Unit No.1
Pin 7 - Grid of
Unit No.1
Pin 8 - Cathode of
Unit No.1
Pin 9 - Heater
Mid-Tap

AMPLIFIER - Class A₁

Values are for each unit

Maximum Ratings, Absolute Values:

PLATE VOLTAGE	330 max.	volts
GRID VOLTAGE:		
Negative bias value	55 max.	volts
Positive bias value	0 max.	volts
PLATE DISSIPATION	0.8 max.	watt
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	100 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	165 max.	°C

OCT. 1, 1953

 TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA 1

5751



5751

HIGH-MU TWIN TRIODE

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN*

	Note	Min.	Max.	
Heater Current	1	0.160	0.190	amp
Amplification Factor	1,2	55	85	
Plate Current	1,2	0.4	1.8	ma
Plate Current	1,3	—	10.5	μ amp
Transconductance	1,2	900	1600	μ mhos
Reverse Grid Current	1,4	—	0.4	μ amp
Heater-Cathode Leakage Current:				
Heater negative with respect to cathode	1,5	—	10	μ amp
Heater positive with respect to cathode	1,5	—	10	μ amp
Leakage Resistance:				
Between Grid and All Other Electrodes Tied Together	1,6	500	—	megohms
Between Plate and All Other Electrodes Tied Together	1,7	500	—	megohms

* Each tube is stabilized before characteristics testing by continuous operation for at least 45 hours at room temperature and with dissipation values equivalent to life test conditions.

Note 1: With 12.6 volts ac or dc on heater (series connected).

Note 2: With dc plate voltage of 250 volts and dc grid voltage of -3 volts. Each unit is tested separately. Electrodes of unit not under test are grounded.

Note 3: With dc plate voltage of 250 volts, plate load resistance of 0.1 megohm, and dc grid voltage of -10.5 volts. Each unit is tested separately. Electrodes of unit not under test are grounded.

Note 4: With dc plate voltage of 250 volts, grid resistor of 1.0 megohm, and dc grid voltage of -3 volts. Each unit is tested separately. Electrodes of unit not under test are grounded.

Note 5: With 100 volts dc between heater and cathode, and units connected in parallel.

Note 6: With grid 100 volts negative with respect to all other electrodes tied together.

Note 7: With plate 300 volts negative with respect to all other electrodes tied together.

SPECIAL RATINGS & PERFORMANCE DATA

Shock Rating:

Impact Acceleration 600 max. g

Tubes are held rigid in three different positions in a Navy Type, High Impact (flyweight) Shock Machine and are subjected to 600 g impact acceleration.

Fatigue Rating:

Vibrational Acceleration 2.5 max. g

Tubes are rigidly mounted and subjected in each of three positions to 2.5 g vibrational acceleration at 25 cycles per second for 32 hours.

OCT. 1, 1953

TUBE DEPARTMENT

TENTATIVE DATA 1

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



5751

5751

HIGH-MU TWIN TRIODE

Low-Frequency Vibration Performance:

RMS Output Voltage 100 max. mv

Under the following conditions and with units connected in parallel; heater voltage of 12.6 volts (series connected), dc plate voltage of 250 volts, dc grid voltage of -3 volts, plate load resistance of 2000 ohms, and vibrational acceleration of 2.5 g at 25 cycles per second.

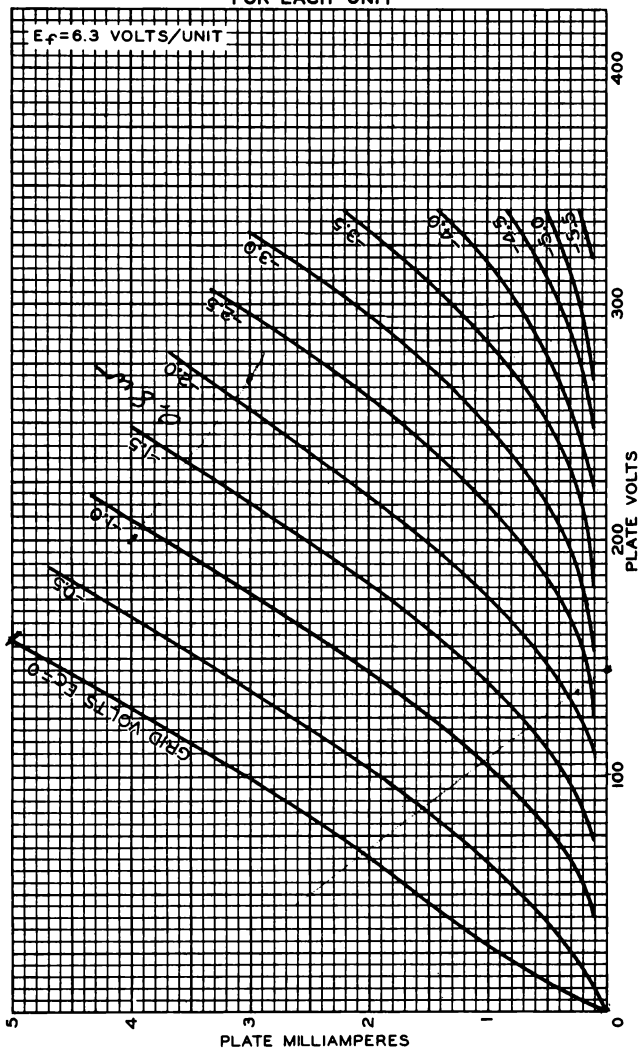
Heater-Cycling Life Performance:

Cycles of Intermittent Operation 2000 min. cycles

Under the following conditions and with parallel heater arrangement: heater voltage of 7.5 volts cycled one minute on and one minute off, heater 100 volts positive with respect to cathode, and plate and grid voltage = 0 volts.



5751
AVERAGE PLATE CHARACTERISTICS
FOR EACH UNIT



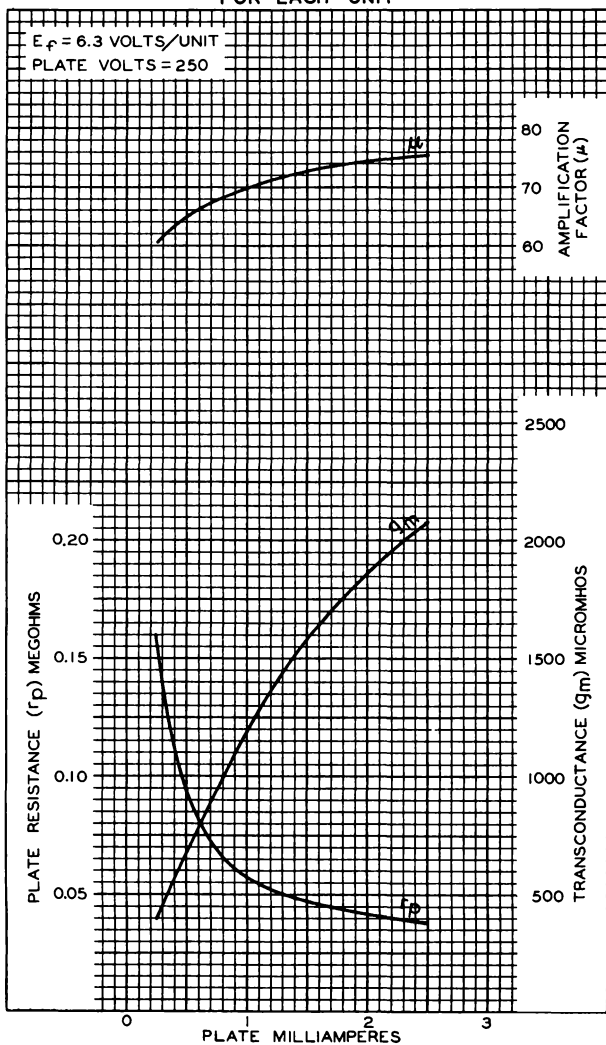
MAR.13,1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7948



5751

AVERAGE CHARACTERISTICS
FOR EACH UNIT

MAR. 12, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7947



5794

FIXED-TUNED OSCILLATOR TRIODE

"PENCIL TYPE" WITH INTEGRAL RESONATORS
For radiosonde service at 1680 Mc

5794

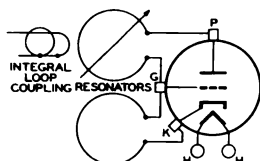
The 5794 is the same as the 6562 except for the following items:

Mechanical:

Dimensions See Dimensional Outline
Terminal Connections (See Dimensional Outline):

H - Heater

K - Cathode



G - Grid

P - Plate

OPERATING CONSIDERATIONS

The *flexible heater leads* of the 5794 are usually soldered to the circuit elements. Soldering of these connections should not be made closer than 3/4" from the end of the tube. If this precaution is not followed, the heat of the soldering operation may crack the glass seals of the leads and damage the tube. Under no circumstances should any of the electrodes be soldered to the circuit elements. Connections to the electrodes should be made by spring contact only.

The 5794 should be supported by a suitable clamp around the metal shell either above or below the frequency-adjustment screw. It is essential, however, that the pressure exerted on the shell by the clamp be held to a minimum because excessive pressure can distort the resonators and result in a change of frequency.

The *plate and cathode connections* should have flexible leads which will accommodate variations in the relative positions of the plate and cathode terminals in individual tubes.

The 5794 may be mechanically tuned by adjustment of the frequency-adjustment screw located on the metal shell of the tube. A clockwise rotation of the frequency-adjustment screw will decrease the frequency, while a counter-clockwise rotation will increase the frequency. The range of adjustment provided by the screw is ± 12 megacycles.

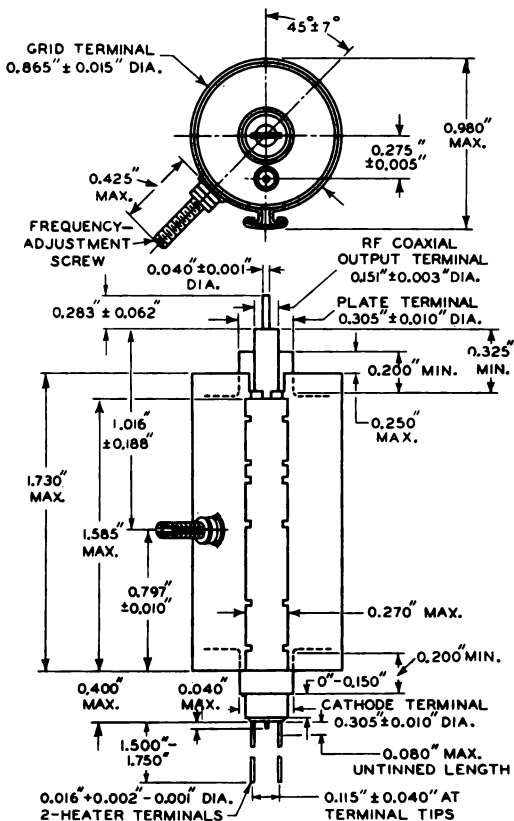
← Indicates a change.

5794



5794

FIXED-TUNED OSCILLATOR TRIODE



92CM-7140R4



5814

5814
PREMIUM TYPE**MEDIUM-MU TWIN TRIODE**

MINIATURE TYPE

*Intended for applications where dependable performance
under shock and vibration is paramount*

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathodes:

Heater Arrangement	Series	Parallel	
Voltage (AC or DC) . . .	12.6 ± 10%	6.3 ± 10%	volts
Current	0.175	0.35	amp

Direct Interelectrode Capacitances (No external shield):

	Unit No. 1	Unit No. 2	
Grid to Plate	1.5	1.5	μf
Input	1.6	1.6	μf
Output	0.50	0.35	μf

Characteristics, Class A₁ Amplifier:

Plate Voltage	100	250	volts
Grid Voltage	0	-8.5	volts
Amplification Factor . . .	19.5	17	
Plate Resistance	6250	7770	ohms
Transconductance	3100	2200	μmhos
Plate Current	11.8	10.5	ma

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length from Base Seat to Bulb Top (Excluding Tip)	1-9/16" ± 3/32"
Maximum Diameter	7/8"
Bulb	T-6-1/2
Base	Small-Button Noval 9-Pin (JETEC No. E9-1)

BOTTOM VIEW

- Pin 1 - Plate of
Unit No. 2
Pin 2 - Grid of
Unit No. 2
Pin 3 - Cathode of
Unit No. 2
Pin 4 - Heater
Pin 5 - Heater



- Pin 6 - Plate of
Unit No. 1
Pin 7 - Grid of
Unit No. 1
Pin 8 - Cathode of
Unit No. 1
Pin 9 - Heater
Mid-Tap

AMPLIFIER - Class A₁

Values are for each unit

Maximum Ratings, Absolute Values:

PLATE VOLTAGE	330 max.	volts
PLATE DISSIPATION	3 max.	watts
CATHODE CURRENT	22 max.	ma

JUNE 1, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA 1



MEDIUM-MU TWIN TRIODE

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	100 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	180 max.	°C

Maximum Circuit Values (For maximum rated conditions):

Grid-Circuit Resistance:

For cathode-bias operation	1.0 max.	megohm
For fixed-bias operation	0.25 max.	megohm

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN*

	Note	Min.	Max.	
Heater Current	1	0.160	0.190	amp
Amplification Factor	1,2	15.5	18.5	
Plate Current	1,2	6.5	14.5	ma
Plate Current	1,3	-	20	μamp
Transconductance	1,2	1750	2650	μmhos
Transconductance	1,4	2500	3700	μmhos
Reverse Grid Current	5,6	-	1.5	μamp
Heater-Cathode				
Leakage Current:				
Heater negative with respect to cathode.	1,7	-	10	μamp
Heater positive with respect to cathode.	1,8	-	10	μamp
Leakage Resistance:				
Between Grid and All Other Electrodes				
Tied Together	1,9	500	-	megohms
Between Plate and All Other Electrodes				
Tied Together	1,10	500	-	megohms

* Each tube is stabilized before characteristics testing by continuous operation for at least 45 hours at room temperature and with dissipation values equivalent to life test conditions.

Note 1: With 12.6 volts ac or dc on heater (series connection).

Note 2: With dc plate voltage of 250 volts and dc grid voltage of -8.5 volts. Each unit is tested separately. Electrodes of units not under test are grounded.

Note 3: With dc plate voltage of 250 volts, plate load resistance of 0.5 megohm, and dc grid voltage of -30 volts. Each unit is tested separately. Electrodes of unit not under test are grounded.

Note 4: With dc plate voltage of 100 volts and dc grid voltage of 0 volts. Each unit is tested separately. Electrodes of unit not under test are grounded.

Note 5: With 15 volts ac or dc on heater (series connection).

Note 6: With dc plate voltage of 250 volts, grid resistor of 0.5 megohm, and dc grid voltage of -30 volts. Each unit is tested separately. Electrodes of unit not under test are grounded.

Note 7: With -100 volts dc between heater and cathode, and units connected in parallel.

Note 8: With +100 volts dc between heater and cathode, and units connected in parallel.



5814

5814

MEDIUM-MU TWIN TRIODE

Note 9: With grid 100 volts negative with respect to all other electrodes tied together.

Note 10: With plate 300 volts negative with respect to all other electrodes tied together.

SPECIAL RATINGS and PERFORMANCE DATA**Shock Rating:**

Impact Acceleration 600 max. g

Tubes are held rigid in three different positions in a Navy Type, High Impact (flyweight) Shock Machine and are subjected to 600 g impact acceleration.

Fatigue Rating:

Vibrational Acceleration 2.5 max. g

Tubes are rigidly mounted and subjected in each of three positions to 2.5 g vibrational acceleration at 25 cycles per second for 32 hours.

Low-Frequency Vibration Performance:

RMS Output Voltage 100 max. mv

Under the following conditions and with units connected in parallel: Heater voltage of 12.6 volts, plate voltage supply of 250 volts, dc grid voltage of -8.5 volts, plate load resistance of 2000 ohms, and vibrational acceleration of 2.5 g at 25 cycles per second.

Heater-Cycling Life Performance:

Cycles of Intermittent Operation. . . 2000 min. cycles

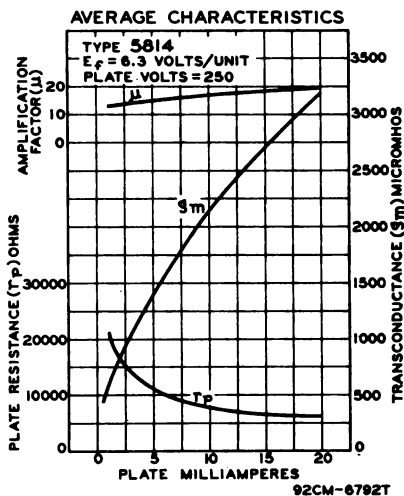
Under the following conditions and with heaters of unit No.1 and unit No.2 connected in parallel: Heater voltage of 7.5 volts cycled one minute on and one minute off, heater 100 volts positive with respect to cathode, and plate and grid voltage = 0 volts.

5814



5814

MEDIUM-MU TWIN TRIODE



JUNE 1, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

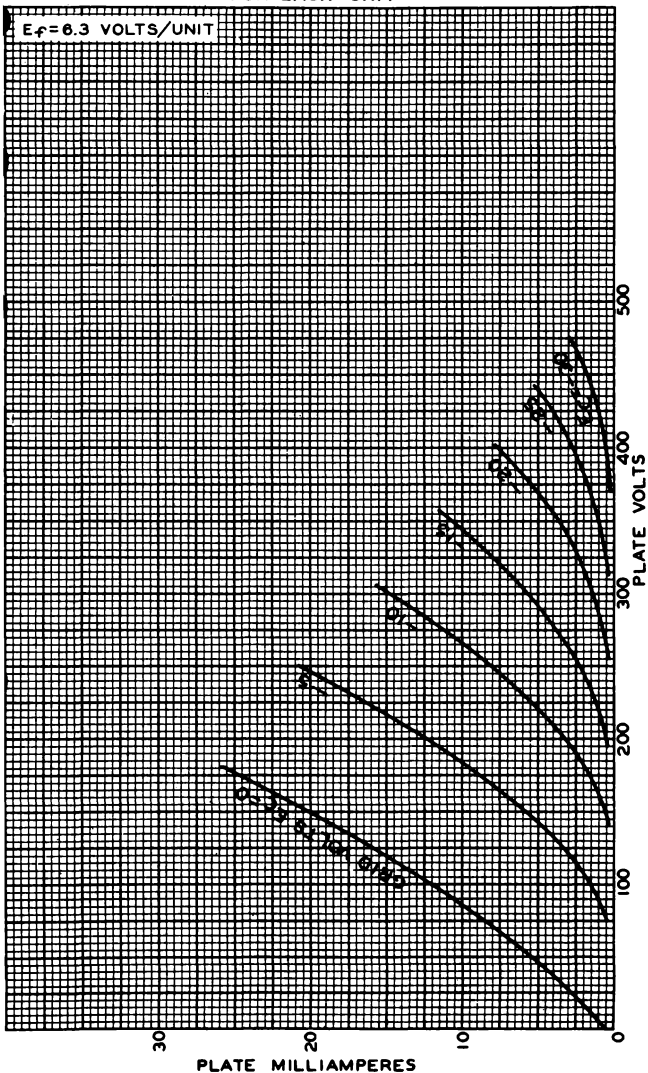
CE-6792T



5814

AVERAGE PLATE CHARACTERISTICS FOR EACH UNIT

5814



FEB. 26, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

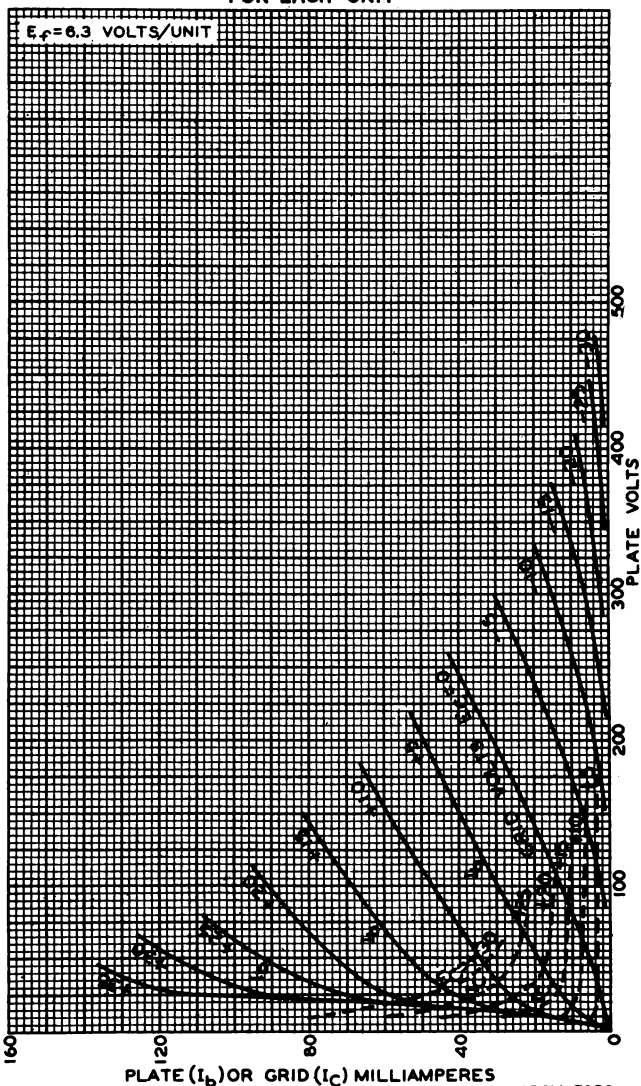
92CM-7939

5814



5814

AVERAGE PLATE CHARACTERISTICS FOR EACH UNIT



FEB. 26, 1953

TUBE DEPARTMENT

92CM-7938

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



5823

GLOW-DISCHARGE TRIODE

COLD-CATHODE, MINIATURE TYPE

5823

GENERAL DATA**Electrical:**Cathode Cold
Ionization Time (Approx.):

For conditions: Instantaneous anode volts = 185;

peak positive starter-electrode pre-firing

volts = 70; peak positive starter-

electrode triggering volts = 50; anode-

circuit series resistor (ohms) = 820;

starter-electrode series resistor

(ohms) = 100000

20 μ sec

Deionization Time (Approx.):

For conditions: (Same as for Ionization Time)

500 μ sec

Anode Voltage Drop. 62 volts

Starter-Electrode Voltage Drop. 61 volts

Anode Breakdown Voltage 290 volts

Starter-Electrode Breakdown Voltage 80 volts

Required Transfer Current (DC or

Instantaneous AC) for transition of

discharge to anode at 140 volts peak

50 μ amp**Mechanical:**

Mounting Position Any

Maximum Overall Length. 2-1/8"

Maximum Seated Length 1-7/8"

Length, Base Seat to Bulb Top (excluding tip) . 1-1/2" $\pm$ 3/32"

Maximum Diameter. 3/4"

Bulb. T-5-1/2

Base. Small-Button Miniature 7-Pin

Basing Designation for BOTTOM VIEW 4CK

Pin 1—Anode

Pin 2—Internal

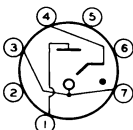
Connection—

Do Not Use

Pin 3—Cathode

Pin 4—Starter

Electrode



Pin 5—Internal

Connection—

Do Not Use

Pin 6—Internal

Connection—

Do Not Use

Pin 7—Cathode

Maximum Ratings[▲], Absolute Values:*For First-Quadrant Operation Only***PEAK ANODE AND STARTER-ELECTRODE VOLTAGE:**

Inverse 200 max. volts

Forward 200 max. volts

[▲] These ratings apply to the 5823 when it is operated from a power supply having a frequency of 60 cycles per second. If a contemplated application involves higher supply frequencies, please write, stating the proposed operating frequency, to the attention of Commercial Engineering, RCA, Harrison, New Jersey for information as to required changes in maximum ratings and characteristics.

SEPT. 15, 1949

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA 1



GLOW-DISCHARGE TRIODE

CATHODE CURRENT:

Peak	100 max.	ma
Average*	25 max.	ma

PEAK STARTER-ELECTRODE CURRENT:

With starter-electrode voltage positive	100 max.	ma
AMBIENT TEMPERATURE	-60 to +75	°C

Typical Operating Conditions:

For Relay Service with 60-Cycle AC Supply

AC Anode Supply Voltage (RMS)	117	volts
AC Starter-Electrode Voltage:		
Max. Peak Positive Pre-Firing Voltage	70	volts
Min. Peak Positive Triggering Voltage	35	volts
Min. Firing Voltage (Sum of In-Phase In-		
stantaneous Pre-Firing Voltage and In-		
stantaneous Triggering Voltage)	105	volts

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

For First-Quadrant Operation Only

	Note	Min.	Max.	
Anode Breakdown Voltage	1	200	-	volts
Starter-Electrode Break-				
down Voltage	2	73	105 [□]	volts
Required Transfer Cur-				
rent (DC or Instantan-				
eous AC) for transition				
of discharge to anode				
at 140 volts peak	3	-	400 [□]	μamp
Anode Voltage Drop	4	-	85 [□]	volts
Starter-Electrode Volt-				
age Drop	5	-	75 [□]	volts

Note 1: With a variable dc anode voltage, dc starter-electrode voltage of 0 volts, anode-circuit series resistance of 3000 ohms, and starter-electrode series resistance of 50000 ohms.

Note 2: With dc anode voltage of 0 volts, variable dc starter-electrode voltage, anode-circuit series resistance of 3000 ohms, and starter-electrode series resistance of 50000 ohms.

Note 3: With a variable dc starter-electrode voltage, anode-circuit series resistance of 3000 ohms, and starter-electrode series resistance of 2 megohms.

Note 4: With dc anode voltage of 230 volts, dc starter-electrode voltage of 91 volts, dc cathode current of 50 milliamperes, anode-circuit series resistance of 3000 ohms, and starter-electrode series resistance of 50000 ohms.

Note 5: With dc anode voltage of 0 volts, variable dc starter-electrode voltage, dc starter-electrode current of 10 milliamperes, and starter-electrode series resistance of 3000 ohms.

* Averaged over any interval of 15 seconds maximum.

□ Maximum individual tube values during life.



5823

5823

GLOW-DISCHARGE TRIODE

OPERATING NOTES

RCA-5823 is recommended for operation only in that part of the breakdown characteristic designated by Quadrant I. Operation in Quadrant II is satisfactory but changes in tube ratings are necessary. Operation in Quadrants III and IV is not recommended, because the anode and starter electrode are not designed for efficient cathode operation; their use in this manner will result in unstable operation and shorter tube life. The information given for Quadrants III and IV is of value to the equipment designer in that it indicates the need for precautions to be taken in order that the peak inverse voltage rating is not exceeded.

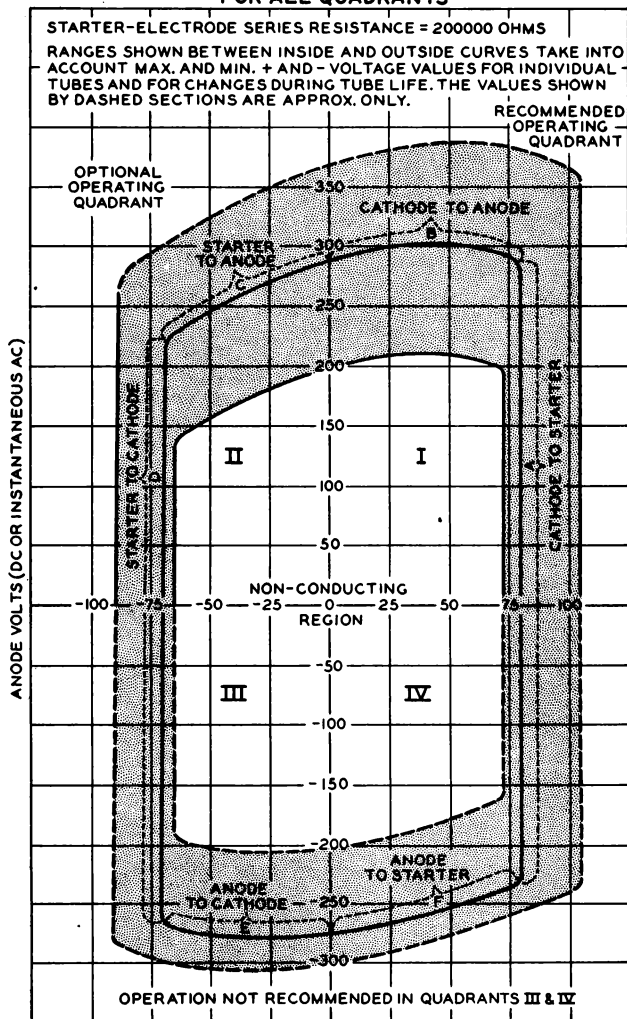
Because of the asymmetrical shape of its anode characteristic the 5823 can be used as a rectifier. When so used (with starter electrode connected through 50000-ohm resistor to anode), the 5823 has a maximum peak inverse anode voltage rating of 200 volts, a maximum peak cathode current of 100 milliamperes, and a maximum dc cathode current of 25 milliamperes. Operation at values of dc cathode current less than 8 milliamperes is not recommended because of resulting instability.

5823



5823

BREAKDOWN CHARACTERISTICS FOR ALL QUADRANTS



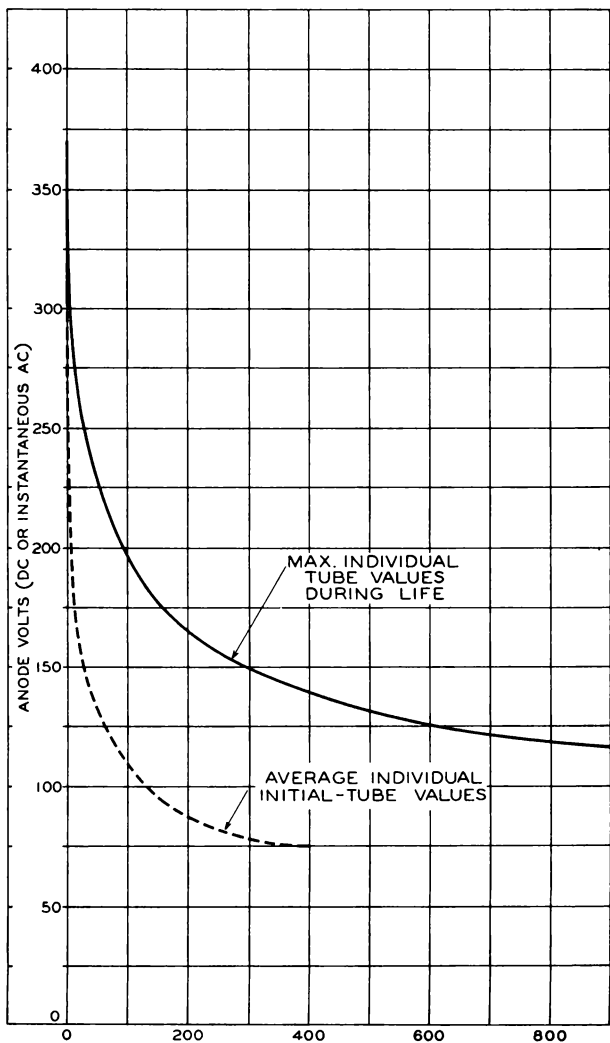
STARTER-ELECTRODE VOLTS (DC OR INSTANTANEOUS AC)



5823

5823

TRANSITION CHARACTERISTIC



STARTER-ELECTRODE MICROAMPERES (DC OR INSTANTANEOUS AC)

MAY 16, 1949

TUBE DEPARTMENT

92CM-7282

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

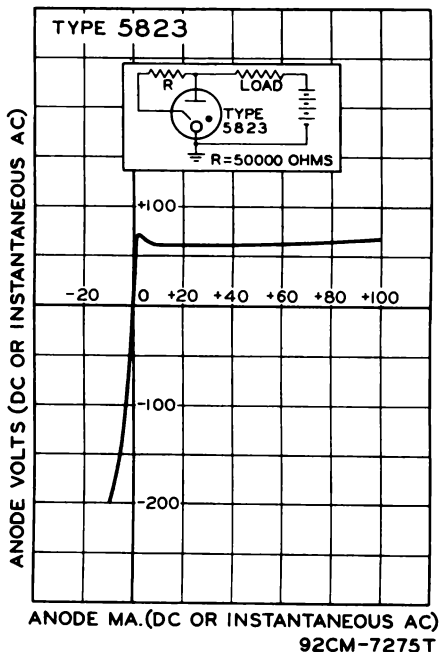
5823



5823

GLOW-DISCHARGE TRIODE

AVERAGE ANODE CHARACTERISTIC





5825

5825

HALF-WAVE VACUUM RECTIFIERGENERAL DATA**Electrical:**

Filament, Thoriated Tungsten:

Voltage 1.6 ac volts

Current 1.25 amp

Direct Interelectrode Capacitance:⁰Plate to Filament 2.2 μmf

Tube Voltage Drop at maximum

peak plate current 1750 volts

⁰ With no external shield.**Mechanical:**

Mounting Position Any

Overall Length 5-11/16" $\pm$ 5/32"Seated Length 5-1/6" $\pm$ 5/32"

Maximum Diameter 2-1/16"

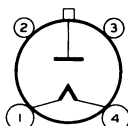
Bulb ST-16

Cap Medium

Base Medium-Shell Small 4-Pin

Basing-Designation for BOTTOM VIEW 4P

Pin 1 - Filament

Pin 2 - No
ConnectionPin 3 - No
ConnectionPin 4 - Filament,
Internal
Shield

Cap - Plate

HALF-WAVE RECTIFIER**Maximum Ratings, Absolute Values:***For supply frequencies up to 250 kc*

PEAK INVERSE PLATE VOLTAGE 60000 max. volts

PEAK PLATE CURRENT 40 max. ma

AVERAGE PLATE CURRENT 2 max. ma

HOT-SWITCHING TRANSIENT CURRENT for

duration of 0.1 sec. max. 100 max. ma

PLATE DISSIPATION 3.5 max. watts

BULB TEMPERATURE 80 max. $^{\circ}\text{C}$ **Typical Operation at 70 kc in Half-Wave Circuit****with Capacitor-Input to Filter:**

AC Plate-Supply Voltage (RMS) 21200 volts

Filter-Input Capacitor 350 μmf

Effective Plate-Supply Impedance 120000 ohms

DC Output Current 2 ma

DC Output Voltage at Input to Filter (Approx.):

At half-load current (1 ma) 28000 volts

At full-load current (2 ma) 26700 volts

Voltage Regulation (Approx.):

Half-load to full-load current 1300 volts

SEPT. 15, 1949

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA

5825



5825

HALF-WAVE VACUUM RECTIFIER

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	<u>Note</u>	<u>Min.</u>	<u>Max.</u>	
Filament Current	1	1.15	1.35	amp
Plate-Filament Capacitance	-	2.14	2.26	μf

Note: With 1.6 volts dc on filament.

OPERATING NOTES

When the filament is supplied from an rf power source which is at a high dc potential above ground, adjustment of the filament voltage by direct measurement is usually impractical. However, a simple method utilizing visual comparison of filament temperatures can be used for adjustment of filament power. The color temperature of the filament operating from an rf power source may be checked visually by observing in a darkened room the reflection of the incandescent filament upon the surface of the internal shield. A visual comparison of this color temperature with that obtained when the filament of another 5825 is operated from a dc or low-frequency ac supply of 1.6 volts, provides a convenient means for adjusting the amount of rf excitation to produce 1.6 volts (rms) at the filament terminals.

The filament must never under any condition of operation be allowed to reach a temperature higher than that caused by operating the filament on dc or low-frequency ac at a voltage of 1.68 volts. Operation at higher temperatures will cause impaired performance of the tube. During circuit adjustment, however, it is permissible to allow the filament voltage to rise to 2 volts for the brief interval required to make the adjustment.

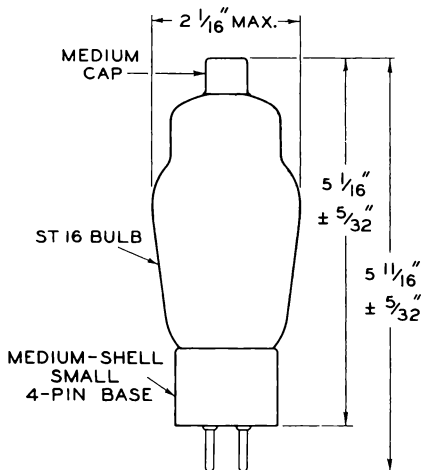
Soft x-rays are produced when the 5825 is operated at a plate voltage above approximately 20000 volts. These rays can constitute a health hazard unless the tube is adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.



5825

5825

HALF-WAVE VACUUM RECTIFIER



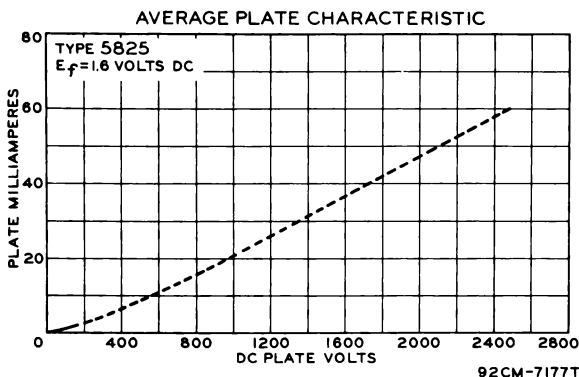
92CS-7176

5825



5825

HALF-WAVE VACUUM RECTIFIER



SEPT. 15, 1949

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-7177T



5840

SHARP-CUTOFF PENTODE

SUBMINIATURE TYPE

5840
PREMIUM TYPE

Intended for applications where dependable performance under shock and vibration is paramount.

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathode:

Voltage $6.3 \pm 5\%$ ac or dc volts

Current 0.150 amp

Direct Interelectrode Capacitances:

	With Exter- nal Shield ^o	Without Exter- nal Shield	
Grid No.1 to Plate . .	0.015 max.	0.03 max.	μmf
Input	4.2	4.0	μmf
Output	3.4	1.9	μmf

^o having inside diameter of 0.405" and connected to cathode.**Characteristics, Class A₁ Amplifier:**

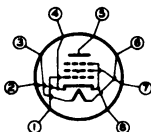
Plate Supply Voltage	100	volts
Grid-No.2 Supply Voltage	100	volts
Cathode Resistor	150	ohms
Plate Resistance	260000	ohms
Transconductance	5000	μmhos
Plate Current	7.5	ma
Grid-No.2 Current	2.4	ma
Grid-No.1 Volts (Approx.) for plate current of 10 μamp	-9	volts

Mechanical:

Operating Position	Any
Maximum Bulb Length	1-3/8"
Length from Button Seal to Bulb Top (Excluding tip)	1.075" $\pm$ 0.060"
Diameter	0.383" $\pm$ 0.017"
Bulb	T-3
Leads, Flexible	8
Length	1-1/2" to 1-3/4"
Orientation and Diameter	See Dimensional Outline in GENERAL SECTION

BOTTOM VIEW

Lead No.1-Grid No.1
Lead No.2-Cathode,
Grid No.3
Lead No.3-Heater
Lead No.4-Cathode,
Grid No.3



Lead No.5-Plate
Lead No.6-Heater
Lead No.7-Grid No.2
Lead No.8-Cathode,
Grid No.3

AMPLIFIER - Class A₁**Maximum Ratings, Absolute Values:**

DC PLATE VOLTAGE	165 max. volts
GRID-No.2 (SCREEN) VOLTAGE	155 max. volts

JUNE 1, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA 1

5840



5840

SHARP-CUTOFF PENTODE

GRID-No.1 (CONTROL-GRID) VOLTAGE:

Negative bias value 55 max. volts

PLATE DISSIPATION 1.1 max. watts

GRID-No.2 INPUT 0.55 max. watt

DC CATHODE CURRENT 16.5 max. ma

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect

to cathode 200 max. volts

Heater positive with respect

to cathode 200 max. volts

BULB TEMPERATURE (At hottest point

on bulb surface) 250 max. °C

Typical Operation as Resistance-Coupled Amplifier:

See RESISTANCE-COUPLED AMPLIFIER CHART
at end of tabulated data for this type

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:

For cathode-bias operation 1.2 max. megohms

For fixed-bias operation Not recommended

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN*

	Note	Min.	Max.	
Heater Current	1	0.138	0.162	amp
Grid-No.1-to-Plate Capacitance	2	-	0.015	μf
Input Capacitance	2	3.5	4.9	μf
Output Capacitance	2	2.9	3.9	μf
Plate Current	1,3	5.5	9.5	ma
Plate Current	1,4	-	50	μamp
Transconductance	1,3	4100	5900	μmhos
Transconductance	5,3	3750	-	μmhos
Grid-No.1 Current	1,6	-	±0.3	μamp
Grid-No.2 Current	1,3	0.5	3.5	ma
Plate Resistance	1,7	0.175	-	megohm
Heater-Cathode Leakage Current:				
Heater negative with respect to cathode	1,8	-	7.0	μamp
Heater positive with respect to cathode	1,8	-	7.0	μamp
Leakage Resistance:				
Between Grid No.1 and All Other Electrodes Tied Together	1,9	100	-	megohms
Between Plate and All Other Electrodes Tied Together	1,10	100	-	megohms

* See next page.

JUNE 1, 1953

TUBE DEPARTMENT

TENTATIVE DATA 1

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



5840

5840

SHARP-CUTOFF PENTODE

- Note 1: With 6.3 volts ac or dc on heater.
- Note 2: With external shield having inside diameter of 0.405" and connected to cathode.
- Note 3: With plate supply voltage of 100 volts, grid-No.2 supply voltage of 100 volts, cathode resistor of 150 ohms, and cathode bypass capacitor of 1000 microfarads.
- Note 4: With dc plate voltage of 100 volts, dc grid-No.2 voltage of 100 volts, and dc grid-No.1 voltage of -9 volts.
- Note 5: With 5.7 volts ac or dc on heater.
- Note 6: With plate supply voltage of 100 volts, grid-No.2 supply voltage of 100 volts, cathode resistor of 150 ohms, cathode bypass capacitor of 1000 microfarads, and grid-No.1 resistor of 0.1 megohm.
- Note 7: With plate supply voltage of 100 volts, grid-No.2 supply voltage of 100 volts, cathode resistor of 150 ohms bypassed by capacitor having a maximum reactance of 3 ohms.
- Note 8: With 100 volts dc between heater and cathode.
- Note 9: With grid No.1 100 volts negative with respect to all other electrodes tied together.
- Note 10: With plate 300 volts negative with respect to all other electrodes tied together.

* Each tube is stabilized before characteristics testing by continuous operation for at least 45 hours at room temperature and with dissipation values equivalent to life test conditions.

SPECIAL RATINGS & PERFORMANCE DATA**Shock Rating:**

Impact Acceleration 450 max. g
Tubes are held rigid in three different positions in a Navy Type, High Impact (flyweight) Shock Machine and are subjected to 450 g impact acceleration.

Fatigue Rating:

Vibrational Acceleration 2.5 max. g
Tubes are rigidly mounted and subjected in each of three positions to 2.5 g vibrational acceleration at 25 cycles per second for 32 hours.

Uniform Acceleration Rating 1000 max. g

Tubes are subjected in each of three positions to a gradually applied uniform acceleration up to 1000 g.

Low-Frequency Vibration Performance:

RMS Output Voltage 60 max. mv
Under the following conditions: A 100-volt plate and grid-No.2 voltage supply having an impedance not exceeding that of a 40- μ f capacitor, plate load resistance of 10000 ohms, grid-No.1 resistor of 0.1 megohm, cathode resistor of 150 ohms, cathode bypass capacitor of 1000 μ f, and vibrational acceleration of 15 g at 40 cps.

5840



5840

SHARP-CUTOFF PENTODE

Heater-Cycling Life Performance:

Cycles of Intermittent Operation . . . 2500 min. cycles
Under the following conditions: With heater voltage of 7.0 volts cycled 1 minute on and 4 minutes off, heater-cathode voltage of 140 volts (rms), and plate, grid-No.2, and grid-No.1 voltage = 0 volts.

Average Life Performance:

The average life performance based on a 500-hour test at 175°C ambient temperature is not less than 450 hours. This life test is made on sample lot of tubes with heater voltage of 6.3 volts; plate supply voltage of 100 volts; grid-No.2 supply voltage of 100 volts; dc heater-cathode voltage (heater positive with respect to cathode) of 200 volts; cathode resistor of 150 ohms; and grid-No.1 resistor of 1 megohm.

The 500-hour end-point limits for the 5840 with heater voltage of 6.3 volts, plate supply voltage of 100 volts, grid-No.2 supply voltage of 100 volts, cathode resistor of 150 ohms bypassed by capacitor having a maximum reactance of 3 ohms, and dc heater-cathode voltage of 100 volts with heater either positive or negative with respect to cathode are: transconductance, 3250 micromhos minimum; heater-cathode leakage current, 20 microamperes maximum; and grid-No.1 current, +0.9 microampere maximum or -0.9 microampere maximum.



5840

5840

SHARP-CUTOFF PENTODE

OPERATING CONDITIONS AS RESISTANCE-COUPLED AMPLIFIER

Plate-Supply Voltage	100						volts
Plate Load Resistor	0.10	0.10	0.27	0.27	0.47	0.47	meg
Grid-No.2 Resistor	0.22	0.22	0.68	0.68	1.2	1.2	meg
Grid-No.1 Resistor ^o	0.27	0.47	0.47	1.0	0.47	1.0	meg
Cathode Resistor	820	820	2200	2200	3300	3300	ohms
Sig. Input Volt. (rms)	0.1	0.1	0.1	0.1	0.1	0.1	volt
Output Voltage (rms)	8.2	9.0	9.5	11.8	9.2	11.7	volts
Voltage Gain [▲]	82	90	95	118	92	117	
Distortion	2.8	3.8	2.5	3.0	3.1	2.3	%
Sig. Input Volt. (rms)*	0.23	0.22	0.15	0.16	0.12	0.14	volt
Output Voltage (rms)	17.7	18.6	13.6	17	11	16	volts
Voltage Gain [▲]	77	85	91	106	92	114	
Distortion	4.9	4.8	4.7	4.4	4.8	5.0	%

Plate-Supply Voltage	150						volts
Plate Load Resistor	0.10	0.10	0.27	0.27	0.47	0.47	meg
Grid-No.2 Resistor	0.27	0.27	0.82	0.82	1.5	1.5	meg
Grid-No.1 Resistor ^o	0.27	0.47	0.47	1.0	0.47	1.0	meg
Cathode Resistor	560	560	1500	1500	2200	2200	ohms
Sig. Input Volts. (rms)	0.1	0.1	0.1	0.1	0.1	0.1	volt
Output Voltage (rms)	11.5	12.5	13.2	15.5	13	16.7	volts
Voltage Gain [▲]	115	125	132	155	130	167	
Distortion	1.5	2.2	2.4	2.4	3.7	3.0	%
Sig. Input Volt. (rms)*	0.20	0.18	0.16	0.16	0.11	0.14	volt
Output Voltage (rms)	21.7	21.7	20.5	24	14	22.2	volts
Voltage Gain [▲]	109	120	128	150	127	159	
Distortion	4.8	5.0	4.9	4.8	4.2	4.8	%

^o of following stage.[▲] Ratio of signal output to signal input.

* Maximum value to swing the grid of resistance-coupled amplifier tube to the point where its grid No.1 starts to draw current.

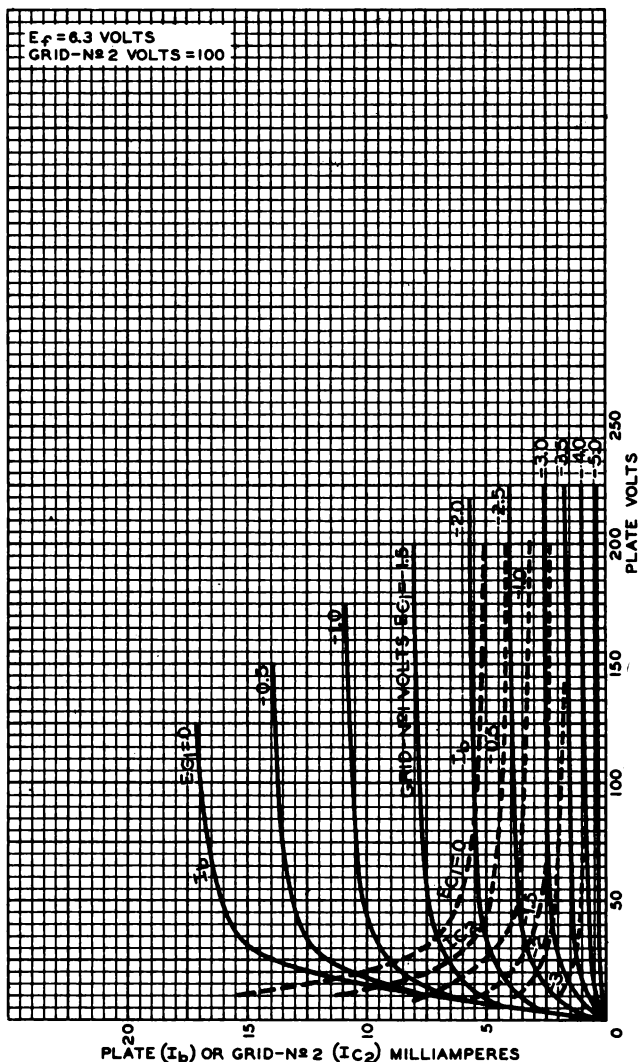
Note: Coupling capacitors should be selected to give desired frequency response. Cathode resistors should be adequately bypassed.

5840



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AVERAGE PLATE CHARACTERISTICS



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92CM-7893

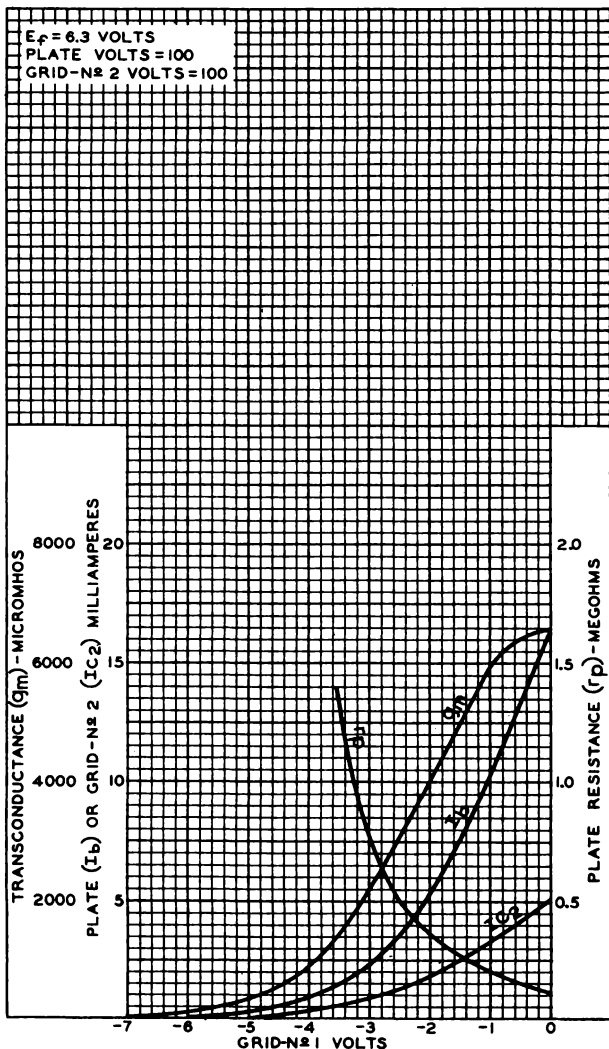
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5840

5840

AVERAGE CHARACTERISTICS



JAN. 8, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7892



5876

5876

UHF HIGH-MU TRIODE

"PENCIL TYPE" FOR GROUNDED-GRID SERVICE

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathode:

Voltage. 6.3 ac or dc volts

Current. 0.135 amp

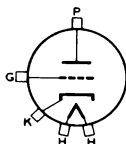
Direct Interelectrode Capacitances:

Grid to Plate. 1.4 μf Grid to Cathode. 2.5 μf Plate to Cathode. 0.035 max. μf **Mechanical:**

Terminal Connections:

H—Heater

K—Cathode



G—Grid

P—Plate

Mounting Position. Any

Dimensions See Outline Drawing

AMPLIFIER— Class A₁**Maximum Ratings, Absolute Values:**

DC PLATE VOLTAGE 300 max. volts

DC GRID VOLTAGE. -100 max. volts

DC PLATE CURRENT 25 max. ma

PLATE DISSIPATION $\diamond$ 6.25 max. watts

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode. 90 max. volts

Heater positive with respect to cathode. 90 max. volts

PLATE-SEAL TEMPERATURE 175 max. $^{\circ}\text{C}$ **Characteristics:**

Plate Voltage. 250 volts

Cathode-Bias Resistor. 75 ohms

Amplification Factor 56

Plate Resistance 8625 ohms

Transconductance 6500 μhos

Plate Current. 18 ma

Maximum Circuit Values:

Grid-Circuit Resistance. 0.5 max. megohm

PLATE-MODULATED RF POWER AMPLIFIER— Class C Telephony

Carrier conditions per tube for use with a max. modulation factor of 1.0

Maximum CCS $^{\circ}$ Ratings, Absolute Values:

DC PLATE VOLTAGE 275 max. volts

 $\diamond$, $\circ$: See next page.

JULY 3, 1950

TUBE DEPARTMENT

TENTATIVE DATA 1

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5876



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UHF HIGH-MU TRIODE

DC GRID VOLTAGE	-100 max.	volts
DC PLATE CURRENT	22 max.	ma
DC GRID CURRENT	8 max.	ma
PLATE INPUT	6.0 max.	watts
PLATE DISSIPATION ^o	4.25 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode.	90 max.	volts
Heater positive with respect to cathode.	90 max.	volts
PLATE-SEAL TEMPERATURE	175 max.	°C

Maximum Circuit Values:

Grid-Circuit Resistance	0.1 max. megohm
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RF POWER AMPLIFIER & OSCILLATOR- Class C Telegraphy

*Key-down conditions per tube without amplitude modulation**

Maximum CCS^o Ratings, Absolute Values:

DC PLATE VOLTAGE	360 max.	volts
DC GRID VOLTAGE	-100 max.	volts
DC PLATE CURRENT	25 max.	ma
DC GRID CURRENT	8 max.	ma
PLATE INPUT	9 max.	watts
PLATE DISSIPATION ^o	6.25 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode.	90 max.	volts
Heater positive with respect to cathode.	90 max.	volts
PLATE-SEAL TEMPERATURE	175 max.	°C

Typical Operation as Oscillator in Grounded-Grid Circuit:

	500 Mc	1700 Mc	
DC Plate Voltage	250	250	volts
DC Grid Voltage [•]	-12	-2	volts
DC Plate Current	23	23	ma
DC Grid Current (Approx.) [□]	6	3	ma
Useful Power Output (Approx.)	3	0.75	watts

Typical Operation as RF Power Amplifier

in Grounded-Grid Circuit:

	500 Mc	
DC Plate Voltage	275	volts
DC Grid Voltage [•]	-51	volts
DC Plate Current	23	ma
DC Grid Current (Approx.) [□]	7	ma
Driver Power Output (Approx.) ^{□*}	2	watts
Useful Power Output (Approx.)	3	watts

Maximum Circuit Values:

Grid-Circuit Resistance	0.1 max. megohm
-----------------------------------	-----------------

◇, •, ○, •, □, *: See next page.

JULY 3, 1950

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA 1



5876

5876

UHF HIGH-MU TRIODE

FREQUENCY MULTIPLIER

Maximum CCSO Ratings, Absolute Values:

DC PLATE VOLTAGE	330 max.	volts
DC GRID VOLTAGE.	-100 max.	volts
DC PLATE CURRENT	22 max.	ma
DC GRID CURRENT.	8 max.	ma
PLATE INPUT.	7.5 max.	watts
PLATE DISSIPATION.	6.25 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode.	90 max.	volts
Heater positive with respect to cathode.	90 max.	volts
PLATE-SEAL TEMPERATURE	175 max.	°C

Typical Operation in Grounded-Grid Circuit:

	<i>Tripler to 480 Mc</i>	<i>Doubler to 960 Mc</i>	
DC Plate Voltage	300	300	volts
DC Grid Voltage.	-90	-70	volts
DC Plate Current	18	17.3	ma
DC Grid Current (Approx.) [ⓐ]	6	7	ma
Driver Power Output (Approx.) ^{ⓐ*}	2.1	2	watts
Useful Power Output (Approx.)	2.1	2	watts

Maximum Circuit Values:

Grid-Circuit Resistance.	0.1 max. megohm
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CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	<i>Note</i>	<i>Min.</i>	<i>Max.</i>	
Heater Current	1	0.125	0.145	amp
Grid-to Plate Capacitance.	—	1.2	1.6	μμf
Grid-to Cathode Capacitance.	—	2.2	2.8	μμf
Plate-to Cathode Capacitance	—	—	0.035	μμf

Note 1: With 6.3 volts ac or dc on heater.

◇ In applications where the plate dissipation exceeds 2.5 watts, it is important that a large area of contact be provided between the plate cylinder and the terminal to provide adequate heat conduction.

ⓐ Continuous Commercial Service.

● Modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115 percent of the carrier conditions.

♣ Obtained from grid resistor.

* In grounded-grid circuits the grid-driving voltage and the developed rf plate voltage act in series to supply the load circuit. As a result, the required driving power is increased over that needed for grounded-cathode circuits. The increased driving power is not lost because it appears as output from the grounded-grid stage. If the driving voltage and grid current are increased, the output will always increase.

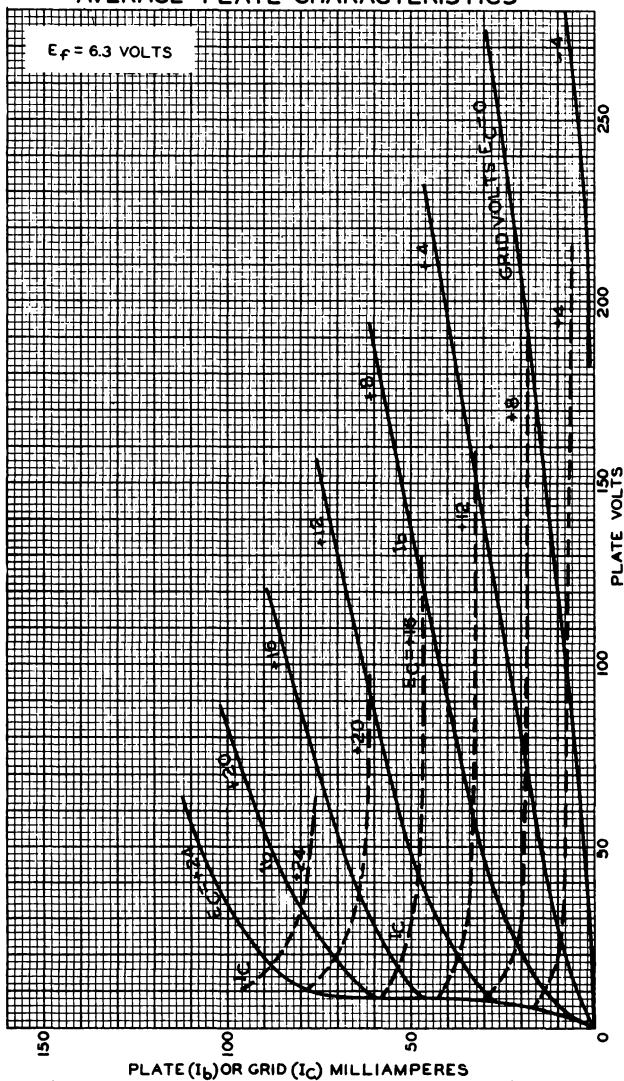
ⓐ For effect of load resistance on grid current and driving power, refer to TUBE RATINGS—Grid Current and Driving Power in General Section.

OUTLINE DIMENSIONS and INSTALLATION NOTES for the 5876 are the same as those shown for Type 5675.



5876

AVERAGE PLATE CHARACTERISTICS



JAN. 6, 1950

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7426



5879

SHARP-CUTOFF PENTODE

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:

Voltage 6.3 ac or dc volts

Current 0.15 amp

Direct Interelectrode Capacitances:⁰

Pentode Connection:

Grid No.1 to Plate. . . 0.15 max. μ f ←

Input 2.7 μ f

Output. 2.4 μ f

Triode Connection (Grids No.2 & No.3 connected to plate):

Grid No.1 to Plate. . . 1.4 μ f

Grid No.1 to Cathode &

Heater. 1.4 μ f

Plate to Cathode &

Heater. 0.85 μ f

⁰ With no external shield.

Mechanical:

Mounting Position Any

Maximum Overall Length. 2-3/16"

Maximum Seated Length 1-15/16"

Length, Base Seat to Bulb Top (Excluding tip) 1-9/16" $\pm$ 3/32"

Maximum Diameter. 7/8"

Bulb. T-6-1/2

Base. Small-Button Noval 9-Pin (JETEC No.E9-1)

Basing Designation for BOTTOM VIEW 9AD

Pin 1-Grid No.1

Pin 2-No Connection

Pin 3-Cathode

Pin 4-Heater

Pin 5-Heater



Pin 6-No Connection

Pin 7-Grid No.2

Pin 8-Plate

Pin 9-Grid No.3

AMPLIFIER - Class A₁

Pentode Connection

Maximum Rating, Design-Center Values:

PLATE VOLTAGE 300 max. volts

GRID-No.2 (SCREEN) VOLTAGE. 150 max. volts

GRID-No.2 SUPPLY VOLTAGE. 300 max. volts

GRID-No.2 INPUT 0.25 max. watt

PLATE DISSIPATION 1.25 max. watts

GRID-No.1 (CONTROL-GRID) VOLTAGE:

Negative Bias Value 50 max. volts

Positive Bias Value 0 max. volts

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode 90 max. volts

Heater positive with respect to cathode 90 max. volts

← Indicates a change

JAN. 1, 1953

TUBE DEPARTMENT

DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5879



5879

SHARP-CUTOFF PENTODE

Characteristics:

Plate Voltage.	250	volts
Grid-No.3 (Suppressor)	Connected to cathode at socket	
Grid-No.2 Voltage.	100	volts
Grid-No.1 Voltage.	-3	volts
Plate Resistance (Approx.)	2	megohms
Transconductance	1000	μ hos
Grid-No.1 Bias (Approx.) for plate current of 10 μ amp	-8	volts
→ Plate Current.	1.8	ma
Grid-No.2 Current.	0.4	ma

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	2.2 max.	megohms
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AMPLIFIER - Class A₁

Triode Connection - Grids No.2 & No.3 Connected to Plate

Maximum Ratings, Design-Center Values:

PLATE VOLTAGE.	250 max.	volts
TOTAL PLATE DISSIPATION.	1.5 max.	watts
GRID-No.1 VOLTAGE		
Negative Bias Value.	50 max.	volts
Positive Bias Value.	0 max.	volts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode.	90 max.	volts
Heater positive with respect to cathode.	90 max.	volts

Characteristics:

Plate Voltage.	100	250	volts
Grid-No.1 Voltage.	-3	-8	volts
Amplification Factor	21	21	
Plate Resistance (Approx.)	17000	13700	ohms
Transconductance	1240	1530	μ hos
Total Plate Current.	2.2	5.5	ma

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	2.2 max.	megohms
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Typical Operation as Resistance-Coupled Amplifier:

*See RESISTANCE-COUPLED AMPLIFIER CHARTS
at front of Receiving Tube Section.*

→ Indicates a change

JAN. 1, 1953

TUBE DEPARTMENT

DATA

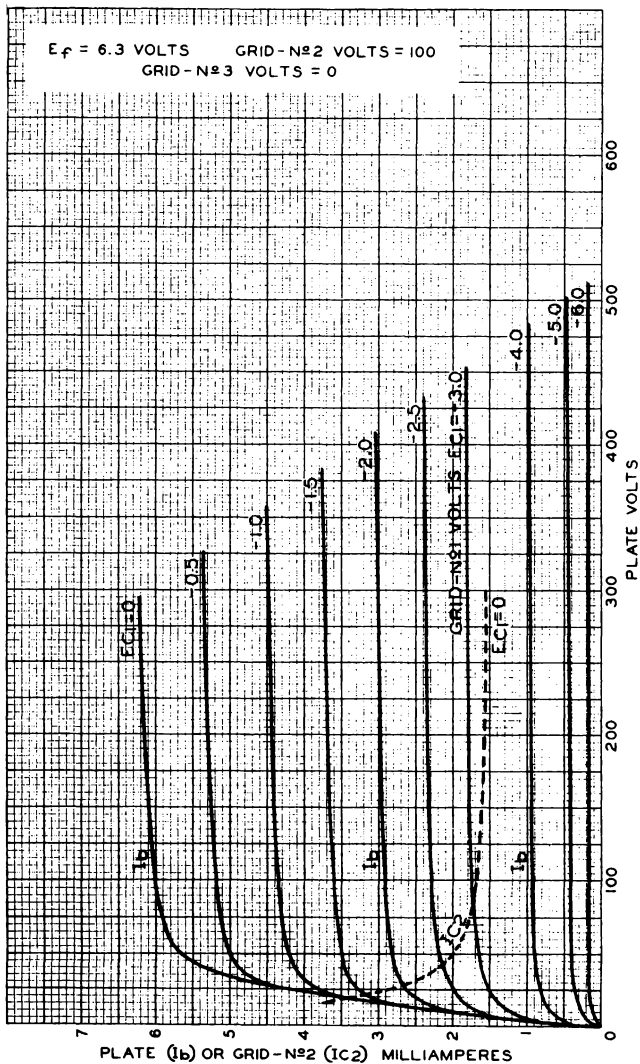
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5879

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AVERAGE PLATE CHARACTERISTICS



FEB. 1, 1950

TUBE DEPARTMENT

92CM - 7439

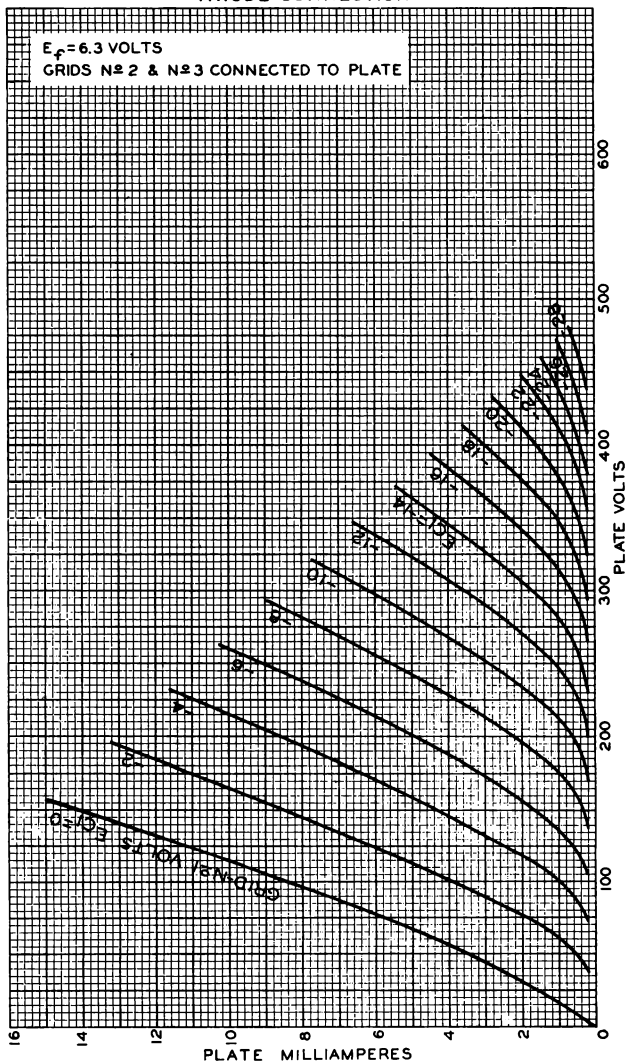
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AVERAGE PLATE CHARACTERISTICS TRIODE CONNECTION



FEB. 9, 1950

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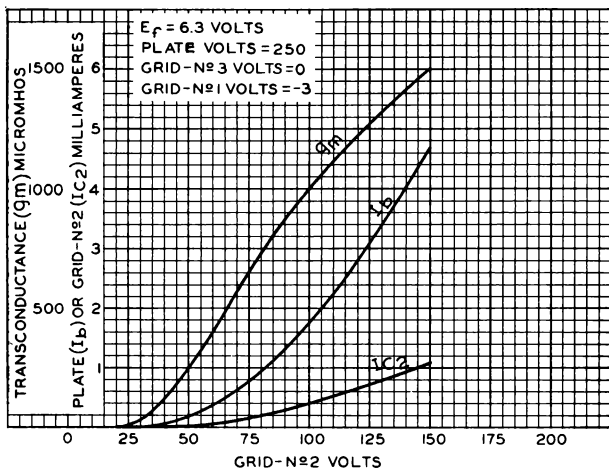
92CM-7446



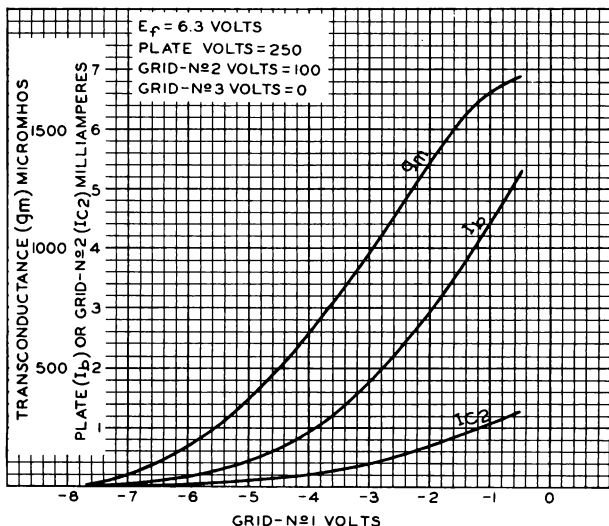
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AVERAGE CHARACTERISTICS



AVERAGE CHARACTERISTICS



FEB. 1, 1950

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7440



5890

5890

REMOTE-CUTOFF BEAM PENTODE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage. 6.3 ac or dc volts

Current. 0.6 amp

Mu-Factor, Grid No.2 to

Grid No.1 5

Direct Interelectrode Capacitances:

Grid No.1 to Plate 0.018 $\mu\mu\text{f}$ Input. 7.5 $\mu\mu\text{f}$ Output 1.6 $\mu\mu\text{f}$

Mechanical:

Mounting Position. Any

Overall Length 6-1/2" $\pm$ 1/4"Seated Length. 6" $\pm$ 1/4"

Maximum Diameter 1-1/2"

Cap. Small

Base Small-Shell Duodecal 7-Pin

Basing Designation for BOTTOM VIEW 12J

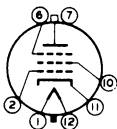
Pin 1-Heater

Pin 2-Grid No.1

Pin 6-Grid No.3

Pin 7- Internal Con.-

Do Not Use



Pin 10-Grid No.2

Pin 11-Cathode

Pin 12-Heater

Cap-Plate

Bulb Temperature 220 max. $^{\circ}\text{C}$

VOLTAGE-CONTROL SERVICE

Maximum CCS* Ratings, Absolute Values:

DC PLATE VOLTAGE 30000 max. volts

DC GRID-No.3 VOLTAGE 6600 max. volts

DC GRID-No.2 VOLTAGE 450 max. volts

DC GRID-No.1 VOLTAGE:

Negative bias value. -200 max. volts

Positive bias value. 0 max. volts

Positive peak value. 2 max. volts

MAX.-SIGNAL DC PLATE VOLTAGE 500 max. volts

MAX.-SIGNAL GRID-No.3 INPUT. 1 max. watt

MAX.-SIGNAL GRID-No.2 INPUT. 0.1 max. watt

PLATE DISSIPATION. 10 max. watts

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode:

During equipment warm-up period

not exceeding 15 seconds 450 max. volts

After equipment warm-up period 165 max. volts

Heater positive with respect to cathode. 165 max. volts

* : See next page.

MAY 1, 1950

TUBE DEPARTMENT

TENTATIVE DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5890



5890

REMOTE-CUTOFF BEAM PENTODE

Typical Operation as Shunt Voltage-

Regulator Tube in Accompanying Circuit

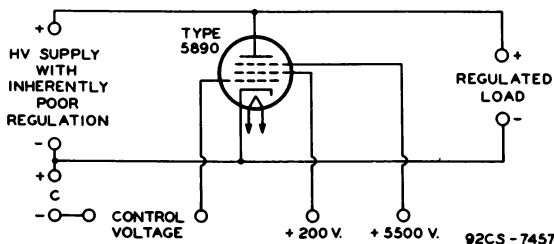
DC Plate Voltage.	20000	30000	volts
DC Grid-No.3 Voltage.	5500	5500	volts
DC Grid-No.2 Voltage*.	200	200	volts
DC Grid-No.1 Voltage**.	-60	-60	volts
Peak Grid-No.1 Voltage.	45	20	volts
Zero-Sig. DC Plate Cur.	0	0	μ amp
Max.-Sig. DC Plate Cur.	500	60	μ amp
Zero-Sig. DC Grid-No.3 Cur.	0	0	μ amp
Max.-Sig. DC Grid-No.3 Cur.	0	0	μ amp
Zero-Sig. DC Grid-No.2 Cur.	0	0	μ amp
Max.-Sig. DC Grid-No.2 Cur.	0	0	μ amp
Grid-No.1 Bias (Approx.) for plate current of 10 μ amp.			
	-52	-52	volts
Grid-No.1—Plate Transconductance	11	3	μ mos

• Continuous Commercial Service.

* Subject to variation of $\pm 40\%$ if grid-No.1 voltage is desired at indicated value.

** Subject to variation of $\pm 40\%$ if grid-No.2 voltage is desired at indicated value.

Shunt Voltage-Regulator Circuit



NOTE: THE CONTROL VOLTAGE MAY BE TAKEN FROM THE LOAD CIRCUIT OR FROM A CIRCUIT SUPPLYING SIGNAL TO THE LOAD CIRCUIT, DEPENDING ON THE TYPE OF LOAD INVOLVED.

OPERATING NOTES

Operation of the 5890 with a plate voltage above approximately 16000 volts results in the production of soft x-rays which can constitute a health hazard on prolonged exposure unless the tube is adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.

Devices and arrangements shown or described herein may use patents of RCA or others. Information contained herein is furnished without responsibility by RCA for its use and without prejudice to RCA's patent rights.

MAY 1, 1950

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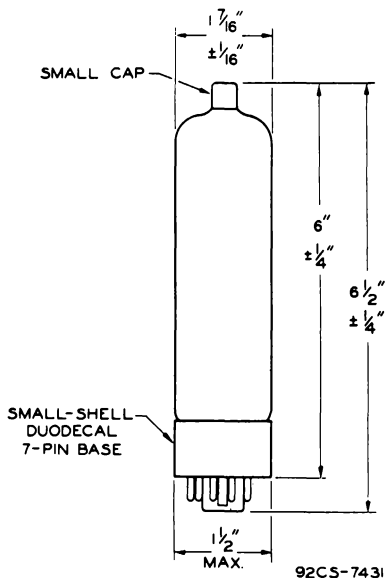
TENTATIVE DATA



5890

5890

REMOTE-CUTOFF BEAM PENTODE



MAY 1, 1950

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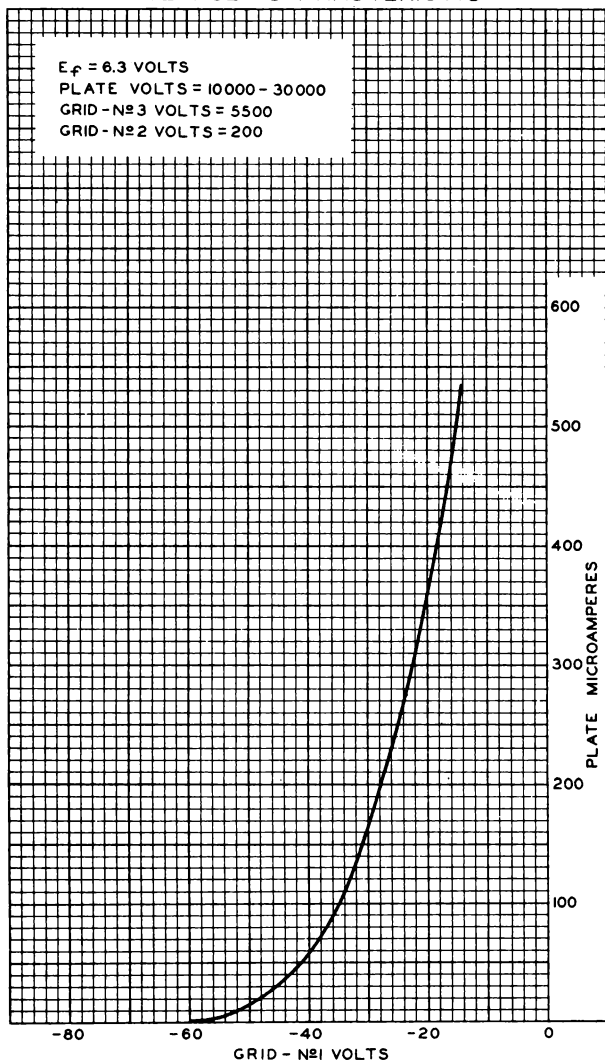
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5890



5890

AVERAGE CHARACTERISTIC



FEB. 9, 1950

TUBE DEPARTMENT

92CM-7445

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



5893

5893

UHF MEDIUM-MU TRIODE

"PENCIL TYPE" FOR GROUNDED-GRID SERVICE

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathode:

Voltage (AC or DC):

Under Transmitting Conditions. 6.0 $\pm$ 10% volts

Under Standby Conditions. 6.3 max. volts

Current. 0.330 amp

Direct Interelectrode Capacitances

(Approx.):

Grid to Plate. 1.75 μf Grid to Cathode. 2.5 μf Plate to Cathode. 0.07 max. μf **Characteristics, Class A₁ Amplifier:**

Plate Voltage. 200 volts

Cathode-Bias Resistor. 100 ohms

Amplification Factor. 27

Plate Resistance. 4500 ohms

Transconductance. 6000 μhos

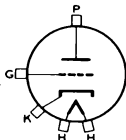
Plate Current. 25 ma

Mechanical:

Terminal Connections:

H-Heater Lead

K-Cathode Cylinder

(Adjacent to
Heater Leads)

G-Grid Flange

P-Plate Cylinder

(Adjacent to
pinch-off)

Mounting Position. Any

Dimensions. See Outline Drawing

Plate Seal Temperature. 175 max. $^{\circ}\text{C}$ **PLATE-PULSED OSCILLATOR[▲] - Class C****Maximum Ratings, Absolute Values:**For a maximum "on" time[♠] of 5 microseconds**PEAK POSITIVE-PULSE PLATE-SUPPLY**VOLTAGE[♠]. 1750 max. volts

PEAK NEGATIVE-PULSE GRID-BIAS VOLTAGE. 150 max. volts

PEAK PLATE CURRENT FROM PULSE SUPPLY. 3 max. amp

[▲] In this class of service, the heater should be allowed to warm up for a minimum of 60 seconds before plate voltage is applied.[♠] "On" time for this tube is the sum of the durations of all the individual pulses which occur during any 5000-microsecond interval. Pulse duration is defined as the time interval between the two points on the pulse at which the instantaneous value is 70% of the peak value. The peak value is defined as the maximum value of a smooth curve through the average of the fluctuations over the top portion of the pulse.[♠]: See next page.

5893



5893

UHF MEDIUM-MU TRIODE

PEAK RECTIFIED GRID CURRENT.	1.3 max.	amp
DC PLATE CURRENT	0.003 max.	amp
DC GRID CURRENT.	0.0013 max.	amp
PLATE DISSIPATION*	6 max.	watts
PULSE DURATION	1.5 max.	μsec

Typical Operation with Rectangular Wave Shape in Grounded-Grid Circuit at 3300 Mc:

With duty factor* of 0.001

Peak Positive-Pulse Plate Supply Voltage♦	1750	volts
Peak Negative-Pulse Grid-Bias Voltage.	110	volts
From Grid Resistor of.	100	ohms
Peak Plate Current from Pulse Supply	3.0	amp
Peak Rectified Grid Current.	1.1	amp
DC Plate Current	0.003	amp
DC Grid Current.	0.0011	amp
Useful Power Output at Peak of Pulse§ (Approx.)	1200	watts
Pulse Duration	1.0	μsec
Pulse Repetition Rate.	1000	pps

PLATE-MODULATED RF POWER AMPLIFIER - Class C Telephony

Carrier conditions per tube for use with a max. modulation factor of 1.0

Maximum Ratings, Absolute Values:

	CCS*	ICAS**	
DC PLATE VOLTAGE	260 max.	320 max.	volts
DC GRID VOLTAGE.	-100 max.	-100 max.	volts
DC PLATE CURRENT	33 max.	33 max.	ma
DC GRID CURRENT.	15 max.	15 max.	ma
PLATE INPUT.	8.5 max.	10.5 max.	watts
PLATE DISSIPATION*	5 max.	5.5 max.	watts

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode . . .	90 max.	90 max.	volts
Heater positive with respect to cathode . . .	90 max.	90 max.	volts

♦ The magnitude of any spike on the plate voltage pulse should not exceed a value of 2000 volts with respect to cathode and its duration should not exceed 0.01 microsecond measured at the peak-pulse-value level.

* Duty factor is the product of pulse duration and repetition rate. For variable pulse durations and pulse repetition rates, the duty factor is defined as the ratio of time "on" to total elapsed time in any 5000-microsecond interval.

§ The power output at peak of pulse is obtained from the average power output using the duty factor of the peak pulse. This procedure is necessary since the power output pulse duty factor may be less than the applied voltage pulse duty factor because of a delay in the start of rf power output.

*, **, **: See next page.

FEB. 1, 1952

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA 1



5893

5893

UHF MEDIUM-MU TRIODE

Typical Operation in Grounded-Grid Circuit at 500 Mc:

	CCS *	ICAS **	
DC Plate Voltage	250	300	volts
DC Grid Voltage†.	-36	-45	volts
DC Plate Current.	30	30	ma
DC Grid Current (Approx.) . . .	11	12	ma
Driver Power Output (Approx.)	1.8	2.0	watts
Useful Power Output (Approx.)	5.5	6.5	watts

Maximum Circuit Value:

Grid-Circuit Resistance	0.1 max.	0.1 max. megohm
---------------------------------	----------	-----------------

RF POWER AMPLIFIER AND OSCILLATOR--Class C Telegraphy

Key-down conditions per tube without amplitude modulation*

Maximum Ratings, Absolute Values:

	CCS *	ICAS **	
DC PLATE VOLTAGE.	320 max.	400 max.	volts
DC GRID VOLTAGE	-100 max.	-100 max.	volts
DC PLATE CURRENT.	35 max.	40 max.	ma
DC GRID CURRENT	15 max.	15 max.	ma
PLATE INPUT	11 max.	16 max.	watts
PLATE DISSIPATION*	7 max.	8 max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode.	90 max.	90 max.	volts
Heater positive with respect to cathode.	90 max.	90 max.	volts

Typical Operation as RF Power Amplifier in
Grounded-Grid Circuit at 500 Mc:

DC Plate Voltage.	300	350	volts
DC Grid Voltage†.	-47	-51	volts
DC Plate Current.	33	35	ma
DC Grid Current (Approx.) . . .	13	13	ma
Driver Power Output (Approx.)	2	2.5	watts
Useful Power Output (Approx.)	7.5	8.5	watts

Typical Operation as RF Power Amplifier in
Grounded-Grid Circuit at 1000 Mc:

DC Plate Voltage.	300	350	volts
DC Grid Voltage†.	-30	-33	volts

* Modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115 per cent of the carrier conditions.

*, **, †, : See next page.

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UHF MEDIUM-MU TRIODE

	CCS*	ICAS**	
DC Plate Current	33	35	ma
DC Grid Current (Approx.). . .	12	13	ma
Driver Power Output (Approx.).	1.9	2.4	watts
Useful Power Output (Approx.).	5.5	6.5	watts
Typical Operation as Oscillator in Grounded-Grid			
Circuit at 500 Mc:			
DC Plate Voltage	300	350	volts
DC Grid Voltage†	-47	-51	volts
DC Plate Current	33	35	ma
DC Grid Current (Approx.). . .	13	13	ma
Useful Power Output (Approx.).	5	6	watts
Maximum Circuit Value:			
Grid-Circuit Resistance. . . .	0.1 max.	0.1 max.	megohm
FREQUENCY DOUBLER			
Maximum Ratings, Absolute Values:			
	CCS*	ICAS**	
DC PLATE VOLTAGE	260 max.	320 max.	volts
DC GRID VOLTAGE.	-100 max.	-100 max.	volts
DC PLATE CURRENT	33 max.	33 max.	ma
DC GRID CURRENT.	12 max.	12 max.	ma
PLATE INPUT.	8.5 max.	10.5 max.	watts
PLATE DISSIPATION*.	6 max.	7.5 max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	90 max.	90 max.	volts
Heater positive with respect to cathode	90 max.	90 max.	volts
Typical Operation as Doubler to 1000 Mc. in			
Grounded-Grid Circuit:			
DC Plate Voltage	250	300	volts
DC Grid Voltage†	-40	-50	volts
DC Plate Current	33	33	ma
DC Grid Current (Approx.). . .	7	8	ma
* In applications where the plate dissipation exceeds 2.5 watts, it is important that a large area of contact be provided between the plate cylinder and the connector in order to provide adequate heat conduction.			
• Continuous Commercial Service.			
•• Intermittent Commercial and Amateur Service.			
† obtained from grid resistor.			

FEB. 1, 1952

TUBE DEPARTMENT

TENTATIVE DATA 2

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



5893

UHF MEDIUM-MU TRIODE

5893

	CCS*	ICAS**	
Driver Power Output (Approx.)	3.2	3.5	watts
Useful Power Output (Approx.)	2.75	3.0	watts
Maximum Circuit Value:			
Grid-Circuit Resistance. . . .	0.1 max.	0.1 max.	megohm

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	Min.	Max.	
Heater Current	1	0.3	0.36	amp
Grid-to-Plate Capacitance. .	-	1.45	2.05	μf
Grid-to-Cathode Capacitance.	-	2.05	2.95	μf
Plate-to-Cathode Capacitance	-	-	0.07	μf
Plate Current.	1,2	16	34	ma
Useful Power Output at Peak of Pulse	1,3	750	-	watts

Note 1: With 6.0 volts ac or dc on heater.

Note 2: With dc plate voltage of 200 volts and cathode resistor of 100 $\pm 1\%$ ohms.

Note 3: With peak positive-pulse plate-supply voltage of 1750 volts, grid resistor varied to give dc plate current of 3 ma, dc grid current of approximately 1.1 ma, duty factor of 0.001, and frequency of 3300 Mc.

INSTALLATION NOTES

Connections to the cathode cylinder, grid flange, and plate cylinder should be made by flexible spring contacts only. The connectors must make firm, large-surface contact, yet must be sufficiently flexible so that no part of the tube is subjected to strain. Unless this recommendation is observed, the glass-to-metal seals may be damaged.

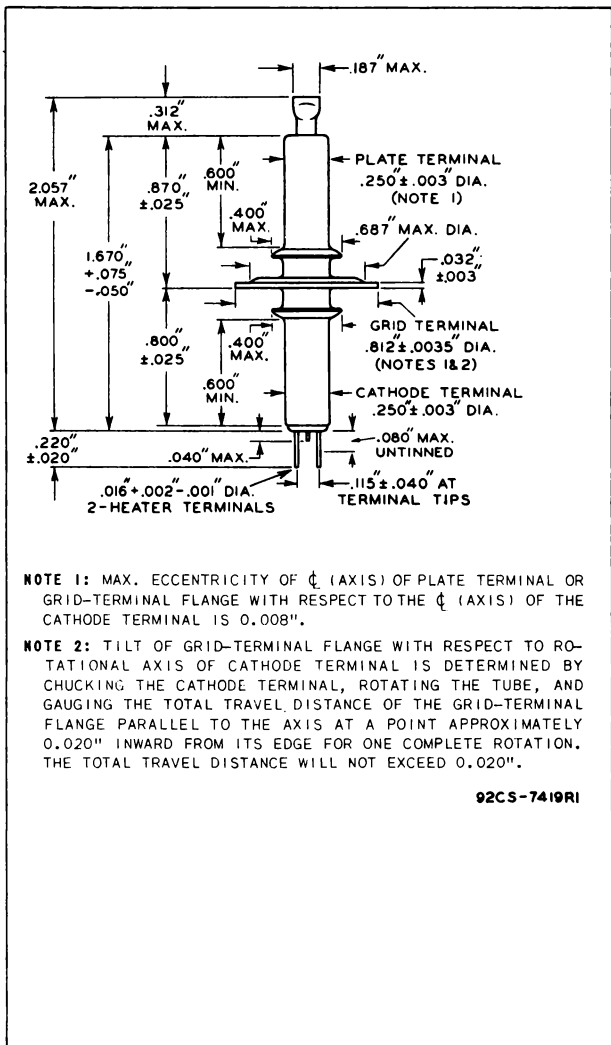
The heater leads of the 5893 fit the Cinch socket No. 54A11953. They should not be soldered to circuit elements. The heat of the soldering operation may crack the glass seals of the heater leads and damage the tube.

5893



5893

UHF MEDIUM-MU TRIODE



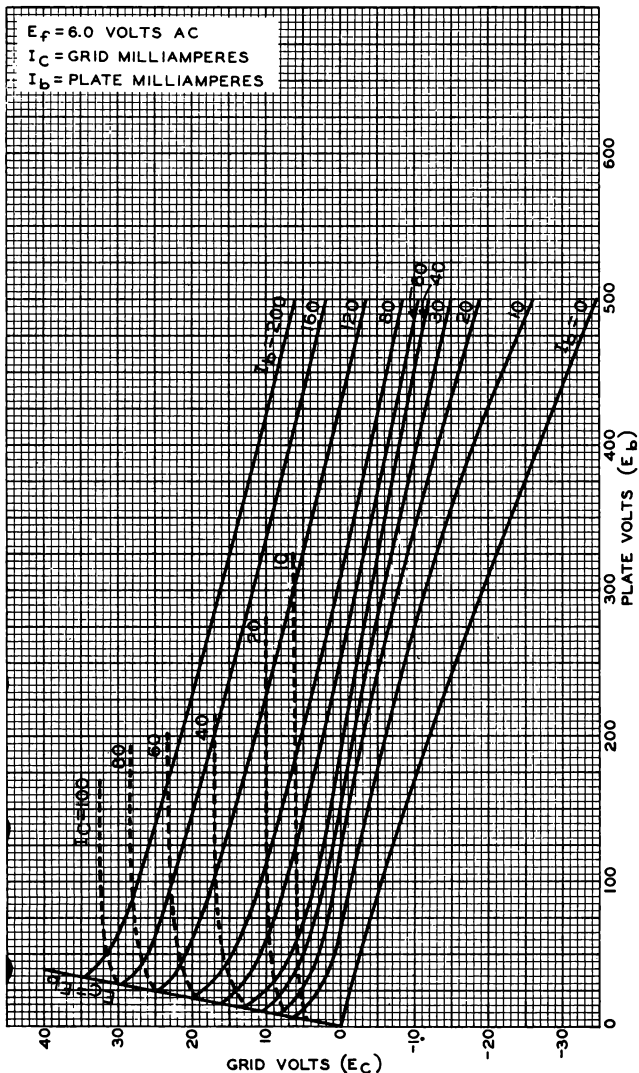
92CS-7419R1



5893

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AVERAGE CONSTANT-CURRENT CHARACTERISTICS



JAN. 23, 1952

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

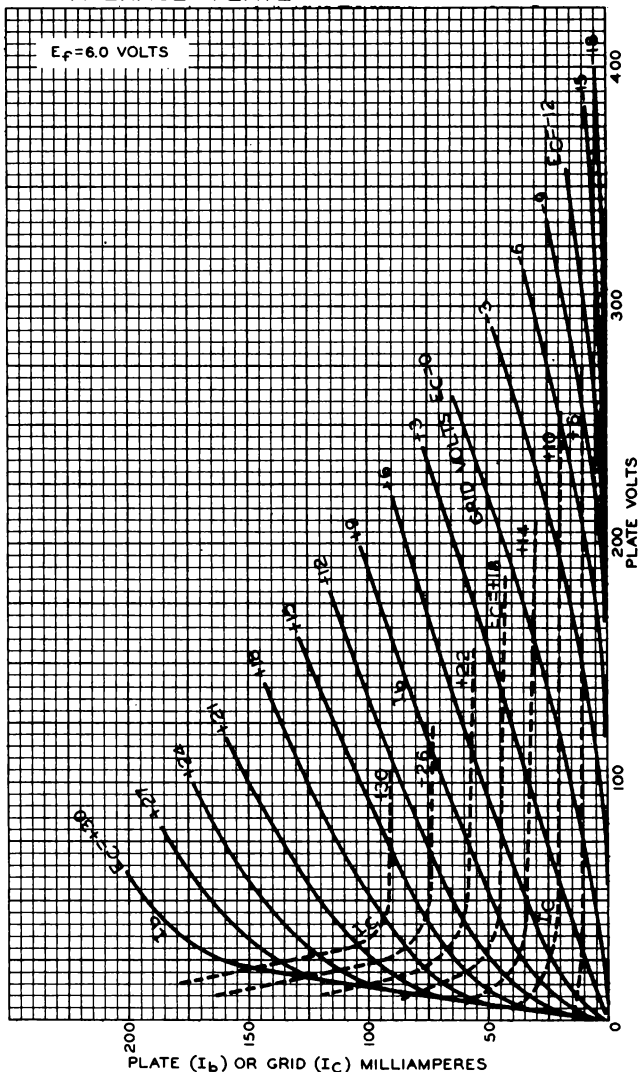
92CM-7609R1

5893



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AVERAGE PLATE CHARACTERISTICS



JUNE 13, 1951

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

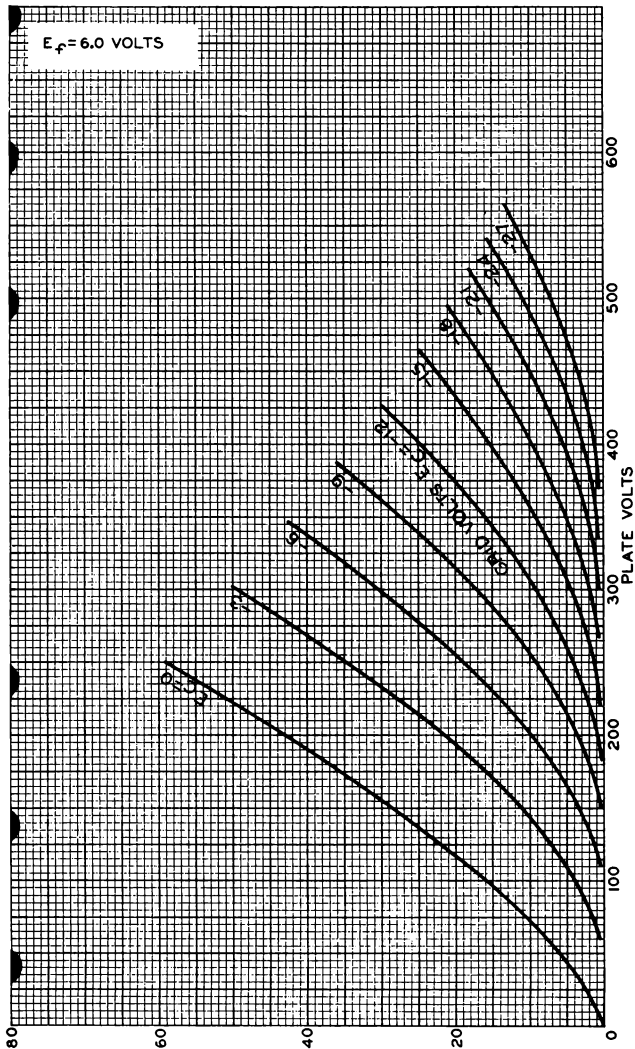
92CM-7810



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AVERAGE PLATE CHARACTERISTICS



JUNE 13, 1951

PLATE MILLIAMPERES

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

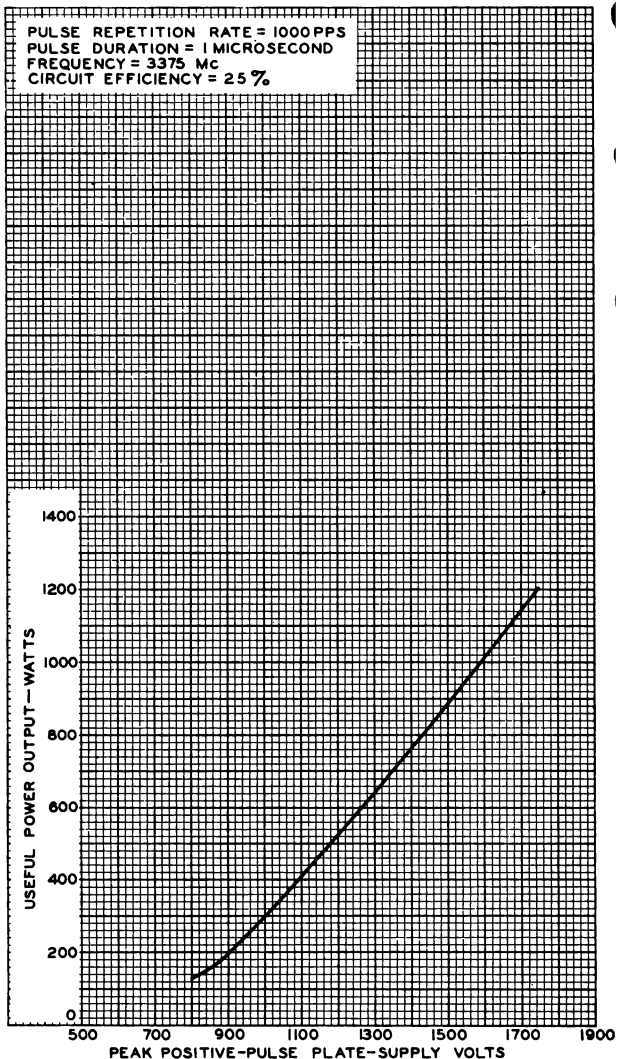
92CM-7483

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AVERAGE PERFORMANCE CHARACTERISTIC



JUNE 13, 1951

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7668



5915

5915

PENTAGRID AMPLIFIERFOR "ON-OFF" CONTROL APPLICATIONS INVOLVING
LONG PERIODS OF OPERATION UNDER CUTOFF CONDITIONS**GENERAL DATA****Electrical:**

Heater, for Unipotential Cathode:

Voltage. 6.3 $\pm$ 10% ac or dc volts

Current. 0.3 amp

Microphonism Not Tested

Direct Interelectrode Capacitances (Approx.):^oGrid No.1 to Plate . . . 0.08 max. μ fGrid No.3 to Plate . . . 0.35 max. μ fGrid No.1 to Grid No.3. 0.15 max. μ f

Grid No.1 to All Other

Electrodes and Heater. 5.4 μ f

Grid No.3 to All Other

Electrodes and Heater. 6.9 μ f

Plate to All Other

Electrodes and Heater. 7.6 μ f^o with no external shield.**Characteristics, Class A Amplifier:**

Plate Voltage. 67.5 67.5 volts

Grids-No.2 and No.4 Voltage. . . . 67.5 67.5 volts

Grid-No.3 Voltage. 0 -4 volts

Grid-No.1 Voltage. 0 0 volts

Grid-No.1-to-Plate

Transconductance. 2000 - μ hos

Grid-No.3-to-Plate

Transconductance. - 1100 μ hos**Mechanical:**

Mounting Position. Any

Maximum Overall Length 2-1/8"

Maximum Seated Length. 1-7/8"

Length, Base Seat to Bulb Top (Excluding tip). 1-1/2" $\pm$ 3/32"

Maximum Diameter 3/4"

Bulb T-5-1/2

Base Small-Button Miniature 7-Pin

Basing Designation for BOTTOM VIEW 7CH

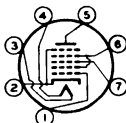
Pin 1-Grid No.1

Pin 2-Cathode,

Grid No.5

Pin 3-Heater

Pin 4-Heater



Pin 5-Plate

Pin 6-Grid No.2,

Grid No.4

Pin 7-Grid No.3

**GATED AMPLIFIER IN COMPUTER SERVICE
& "ON-OFF" CONTROL SERVICE****Maximum Ratings, Absolute Values:**

PLATE VOLTAGE. 250 max. volts

5915



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PENTAGRID AMPLIFIER

GRIDS-No.2 and No.4 VOLTAGE.	See Curve
GRIDS-No.2 and No.4 SUPPLY VOLTAGE	250 max. volts
GRID-No.3 SUPPLY VOLTAGE:	
Negative bias value.	100 max. volts
Positive bias value.	0 max. volts
Peak negative value.	200 max. volts
Peak positive value.	90 max. volts
GRID-No.1 SUPPLY VOLTAGE:	
Negative bias value.	100 max. volts
Positive bias value.	0 max. volts
Peak negative value.	200 max. volts
Peak positive value: Limited in any application by the peak cathode current and the grid-No.1 input	
PLATE DISSIPATION.	1 max. watt
GRID-No.3 INPUT.	0.5 max. watt
GRIDS-No.2 and No.4 INPUT.	1 max. watt
GRID-No.1 INPUT.	0.5 max. watt
DC CATHODE CURRENT	20 max. ma
PEAK CATHODE CURRENT	70 max. ma
PEAK HEATER-CATHODE VOLTAGE:	
Heater negative with respect to cathode. .	90 max. volts
Heater positive with respect to cathode. .	90 max. volts
BULB TEMPERATURE (At hottest point on bulb surface)	120 max. °C

Typical Operation:

	CUTOFF CONDITION		ZERO-BIAS CONDITION	
	Grid-No.1 Control	Grid-No.3 Control		
Plate-Supply				
Voltage.	150	150	150	volts
Grid-No.3 Supply				
Voltage.	0	-10	0	volts
Grids-No.2 & No.4				
Supply Voltage . . .	75	75	75	volts
Grid-No.1 Supply				
Voltage.	-10	0	0	volts
Plate-Circuit				
Resistance . . .	20000	20000	20000	ohms
Grid-No.3-Circuit				
Resistance . . .	47000	47000	47000	ohms
Grids-No.2 & No.4				
Series Resistor. . .	470	470	470	ohms
Grid-No.1-Circuit				
Resistance . . .	47000	47000	47000	ohms
Plate Current.	0	0	5.8	ma
Grids-No.2 & No.4				
Current.	0	14	9	ma

SEPT. 1, 1950

TUBE DEPARTMENT

TENTATIVE DATA 1

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



5915

PENTAGRID AMPLIFIER

5915

Maximum Circuit Values:

Grid-No.1 or Grid-No.3—Circuit Resistance:

For fixed-bias operation 0.5 max. megohm

For cathode-bias operation 1.0 max. megohm

RANGE VALUES FOR EQUIPMENT DESIGN

Cutoff Condition	Note	Min.	Max.	
Plate Current. . . .	1a and 1b	—	0.2	ma
Zero-Bias Condition				
Plate Current. . . .	2	5.0	6.5	ma

Note 1a: For conditions with grid No.1 as control electrode: 6.3 volts on heater, plate-supply volts = 150, grid-No.3 supply volts = 0, grids-No.2 & No.4 supply volts = 75, grid-No.1 supply volts = -10, plate-circuit resistance (ohms) = 20000, grid-No.3 circuit resistance (ohms) = 47000, grids-No.2 & No.4 series resistor (ohms) = 470, and grid No.1-circuit resistance (ohms) = 47000.

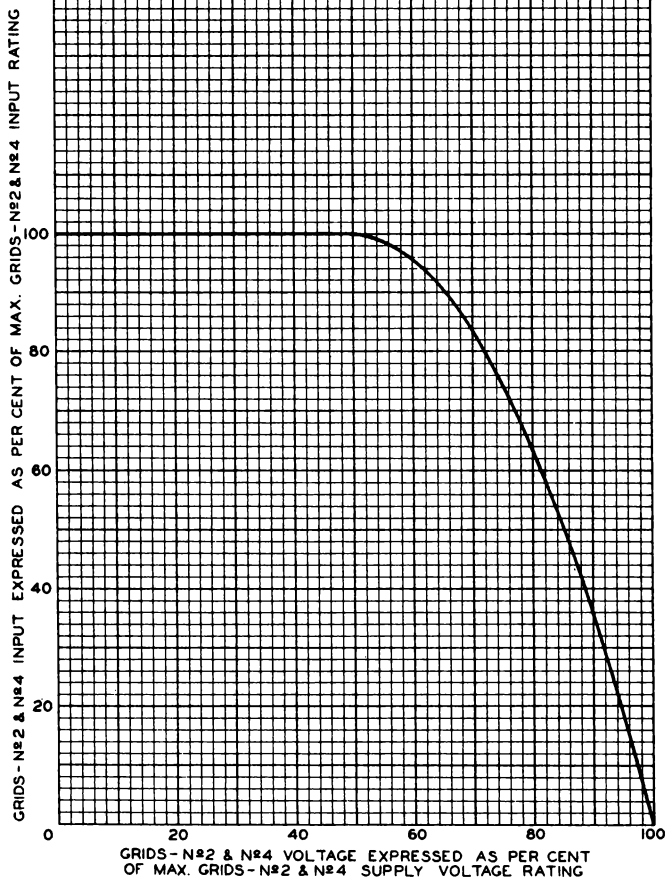
Note 1b: For conditions with grid No.3 as control electrode: values are same as for Note 1a except that grid-No.3 supply volts = -10 and grid-No.1 supply volts = 0.

Note 2: For conditions with 6.3 volts on heater, plate-supply volts = 150, grids-No.2 and No.4 supply volts = 75, grid-No.3 supply volts = 0, grid No.1 supply volts = 0, plate-circuit resistance (ohms) = 20000, grid-No.3-circuit resistance (ohms) = 47000, grids-No.2 and No.4 series resistor (ohms) = 470, and grid-No.1-circuit resistance (ohms) = 47000.

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GRIDS - N^o 2 & N^o 4 INPUT RATING CURVE

JUNE 8, 1950

TUBE DEPARTMENT

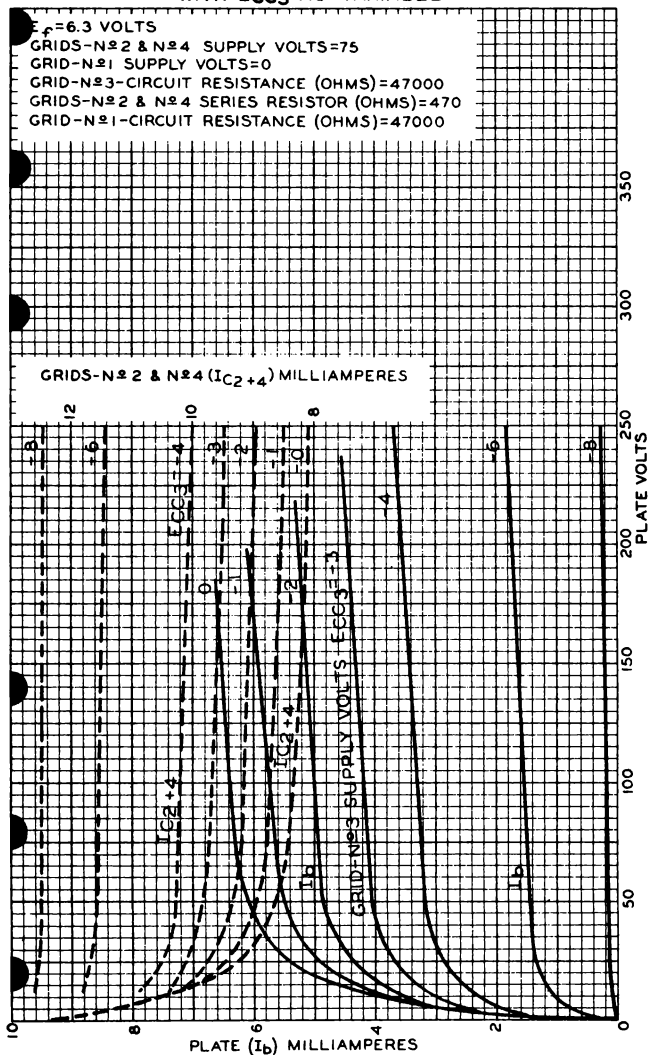
92CM-7500

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



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AVERAGE OPERATION CHARACTERISTICS
WITH ECC3 AS VARIABLE

JUNE 8, 1950

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

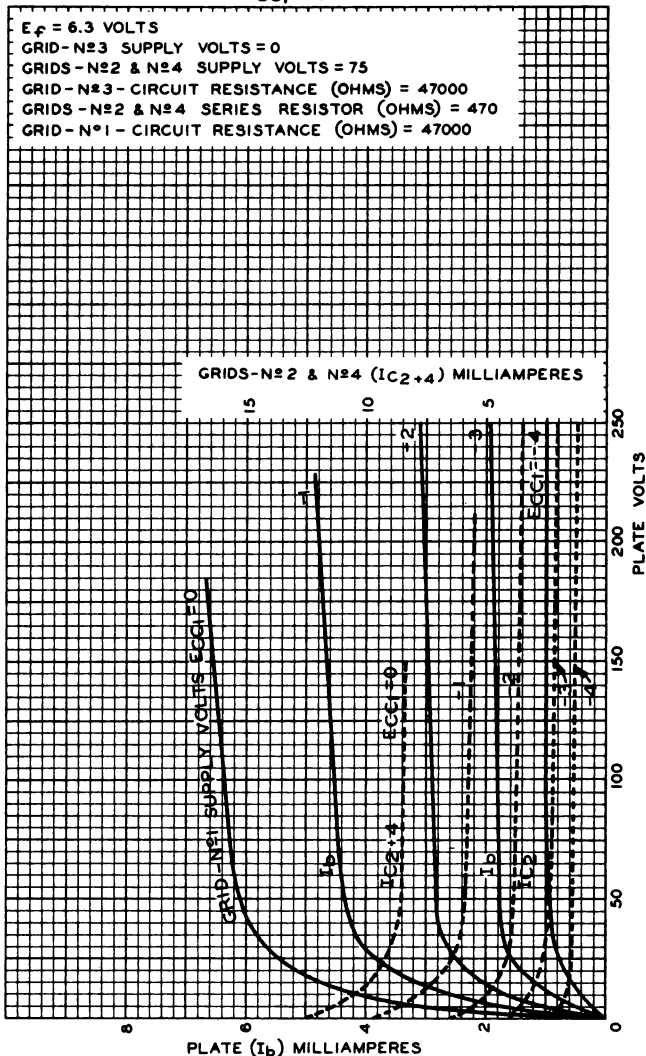
92CM-7499

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AVERAGE OPERATION CHARACTERISTICS WITH E_{C1} AS VARIABLE



JUNE 8, 1950

 TUBE DEPARTMENT
 RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7498



5963

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MEDIUM-MU TWIN TRIODE

9-PIN MINIATURE TYPE

For "on-off" control applications involving
long periods of operation under cutoff conditions

GENERAL DATA**Electrical:**

Heater, Pure Tungsten, for Unipotential Cathodes:

Heater arrangement	Series	Parallel	
Voltage	12.6 $\pm$ 10%	6.3 $\pm$ 10%	ac or dc volts
Current	0.15	0.3	amp

Microphonism. Not Tested

Direct Interelectrode Capacitances (Approx.):^o

	Unit No. 1	Unit No. 2	
Grid to plate	1.5	1.5	μ f
Grid to cathode and heater. .	1.9	1.9	μ f
Plate to cathode and heater .	0.5	0.35	μ f
Grid of unit No.1 to grid of unit No.2	0.1 max.		μ f

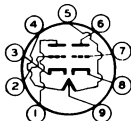
Characteristics, Class A₁ Amplifier (Each Unit):

Plate Voltage	67.5	volts
Grid Voltage.	0	volts
Amplification Factor.	21	
Plate Resistance (Approx.).	6600	ohms
Transconductance.	3200	μ hos
Plate Current	8.5	ma

Mechanical:

Mounting Position	Any
Maximum Overall Length.	2-3/16"
Maximum Seated Length.	1-5/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" $\pm$ 3/32"
Maximum Diameter.	7/8"
Dimensional Outline	See General Section
Bulb.	T-6-1/2
Base.	Small-Button Noval 9-Pin (JETEC No.E9-1)

Basing Designation for BOTTOM VIEW. 9A

Pin 1-Plate of
Unit No.2Pin 2-Grid of
Unit No.2Pin 3-Cathode of
Unit No.2Pins 4 & 9-Heater of
Unit No.2Pins 5 & 9-Heater of
Unit No.1Pin 6-Plate of
Unit No.1Pin 7-Grid of
Unit No.1Pin 8-Cathode of
Unit No.1Pin 9-Heater
Mid-Tap^o Without external shield.

← Indicates a change.

SEPT. 1, 1955

TUBE DIVISION

DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5963



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MEDIUM-MU TWIN TRIODE

FREQUENCY DIVIDER IN COMPUTER SERVICE and "ON-OFF" CONTROL SERVICE

Values are for Each Unit

Maximum Ratings, Absolute Values:

PLATE VOLTAGE.	250 max.	volts
GRID VOLTAGE:		
Negative bias value.	100 max.	volts
Positive bias value.	0 max.	volts
Peak negative value.	200 max.	volts
PLATE DISSIPATION.	2.5 max.	watts
GRID INPUT.	0.5 max.	watt
CATHODE CURRENT:		
Peak.	100 max.	ma
DC.	20 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode.	90 max.	volts
Heater positive with respect to cathode.	90 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	120 max.	°C

Typical Operation as Frequency Halfer:

	<i>Cutoff Condition</i>	<i>Zero-Bias Condition</i>	
Plate-Supply Voltage	150	150	volts
Grid Voltage	-15	0	volts
Plate-Circuit Resistance	20000	20000	ohms
Grid-Circuit Resistance.	47000	47000	ohms
Plate Current.	0	5.1	ma

Maximum Circuit Values:

Grid-Circuit Resistance:	
For fixed-bias operation	0.5 max. megohm
For cathode-bias operation	1.0 max. megohm

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	<i>Note</i>	<i>Min.</i>	<i>Max.</i>	
<i>Cutoff Condition</i>				
Plate Current.	1	-	50	μamp
Difference in Plate Current Between Units.	-	-	50	μamp
<i>Zero-Bias Condition</i>				
Plate Current.	2	4.6	5.4	ma
Difference in Plate Current Between Units.	-	-	0.8	ma

Note 1: For conditions with 12.6 volts on heater, plate-supply volts = 150, grid-supply volts = -15, plate-circuit resistance (ohms) = 20000, and grid-circuit resistance (ohms) = 47000.

Note 2: Conditions are same as for Note 1 except that grid-supply volts = 0.

→ Indicates a change.

SEPT. 1, 1955

TUBE DIVISION

DATA

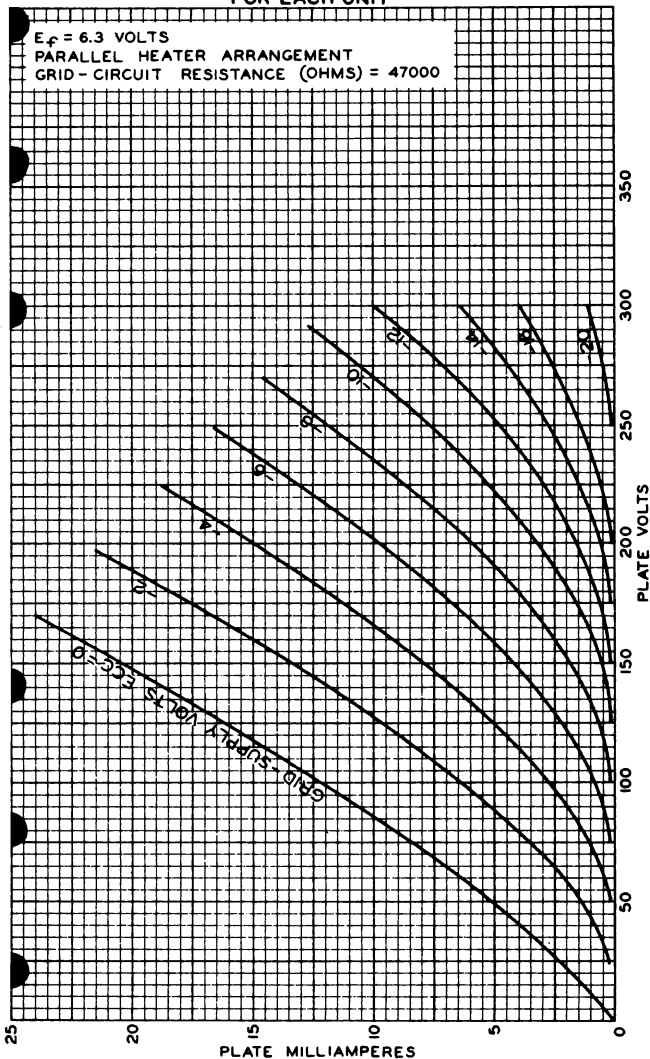
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



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AVERAGE OPERATION CHARACTERISTICS FOR EACH UNIT



MAY 19, 1950

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7493



5964

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MEDIUM-MU TWIN TRIODEFOR "ON-OFF" CONTROL APPLICATIONS INVOLVING
LONG PERIODS OF OPERATION UNDER CUTOFF CONDITIONS**GENERAL DATA****Electrical:**

Heater, for Unipotential Cathode:

Voltage. 6.3 $\pm$ 10% ac or dc volts

Current. 0.45 amp

Microphonism Not Tested

Direct Interelectrode Capacitances (Approx.):^o

Each Unit:

Grid to Plate. 1.3 μ fGrid to Cathode and Heater 2.1 μ fPlate to Cathode and Heater. 0.4 μ f

Grid of Unit No.1 to

Grid of Unit No.2 0.4 max. μ f^o with no external shielding.**Characteristics, Class A Amplifier (Each Unit, with
both units operating):**

Plate Voltage. 100 volts

Cathode-Bias Resistor^{*} 50 ohms

Amplification Factor 39

Plate Resistance 6500 ohms

Transconductance 6000 μ hos

Plate Current. 9.5 ma

Mechanical:

Mounting Position. Any

Maximum Overall Length 2-1/8"

Maximum Seated Length. 1-7/8"

Length, Base Seat to Bulb Top (Excluding tip). 1-1/2" $\pm$ 3/32"

Maximum Diameter 3/4"

Bulb T-5-1/2

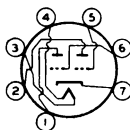
Base Small-Button Miniature 7-Pin

Basing Designation for BOTTOM VIEW 7BF

Pin 1-Plate of
Triode No.2Pin 2-Plate of
Triode No.1

Pin 3-Heater

Pin 4-Heater

Pin 5-Grid of
Triode No.1Pin 6-Grid of
Triode No.2

Pin 7-Cathode

**FREQUENCY DIVIDER IN COMPUTER SERVICE
& "ON-OFF" CONTROL SERVICE***Values are for each unit***Maximum Ratings, Absolute Values:**

PLATE VOLTAGE. 250 max. volts

^{*} Common to both units.

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MEDIUM-MU TWIN TRIODE

GRID VOLTAGE:

Negative bias value.	100 max.	volts
Positive bias value.	0 max.	volts
Peak negative value.	200 max.	volts
PLATE DISSIPATION.	1.5 max.	watts
GRID INPUT	0.1 max.	watt
DC CATHODE CURRENT*.	15 max.	ma
PEAK CATHODE CURRENT*.	75 max.	ma

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode.	90 max.	volts
Heater positive with respect to cathode.	90 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	150 max.	°C

Typical Operation as Frequency Halfer (Each Unit):

	Cutoff Condition	Zero-Bias Condition	
Plate-Supply Voltage	150	150	volts
Plate-Circuit Resistance	20000	20000	ohms
Grid-Supply Voltage.	-10	0	volts
Grid-Circuit Resistance.	47000	47000	ohms
Plate Current.	0	5	ma

Maximum Circuit Values:

Grid-Circuit Resistance:

For fixed-bias operation	0.5 max.	megohm
For cathode-bias operation	1.0 max.	megohm

RANGE VALUES FOR EQUIPMENT DESIGN

Cutoff Condition	Note	Min.	Max.	
Plate Current (Each Unit). 1	-	-	0.2	ma
Difference in Plate Current Between Units. . -	-	-	0.2	ma
Zero-Bias Condition				
Plate Current (Each Unit). 2	4.3	5.7	ma	
Difference in Plate Current Between Units. . -	-	1.4	ma	

Note 1: For conditions with 6.3 volts on heater, plate-supply volts = 150, plate-circuit resistance (ohms) = 20000, grid-supply volts = -10, and grid-circuit resistance (ohms) = 47000.

Note 2: Conditions are same as for Note 1 except that grid-supply volts = 0.

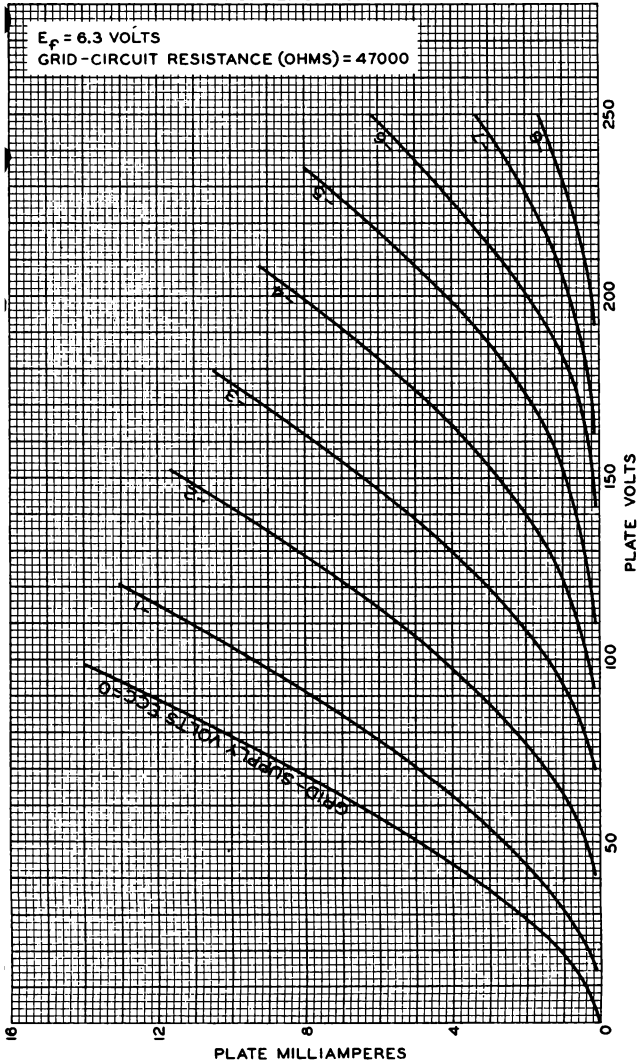
* With both units operating, the dc cathode current should not exceed 30 milliamperes, and the peak cathode current should not exceed 150 milliamperes.



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AVERAGE OPERATION CHARACTERISTICS FOR EACH UNIT



MAY 31, 1950

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7495



5965

5965

MEDIUM-MU TWIN TRIODE

9-PIN MINIATURE TYPE

For "on-off" control applications involving long periods of operation under cutoff conditions.

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathodes:

Heater arrangement	Series	Parallel	
Voltage (AC or DC)	12.6 ± 5%	6.3 ± 5%	volts
Current	0.225	0.45	amp

Direct Interelectrode Capacitances (Approx.):*

Grid to plate (Each unit)	3.0	μf
Grid to cathode and heater (Each unit)	3.8	μf
Plate to cathode and heater (Unit No.1)	0.5	μf
Plate to cathode and heater (Unit No.2)	0.38	μf
Plate of unit No.1 to plate of unit No.2	0.5	μf

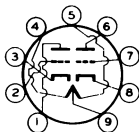
Characteristics, Class A₁ Amplifier (Each Unit):

Plate Supply Voltage	150	volts
Cathode-Bias Resistor	220	ohms
Amplification Factor	47	
Plate Resistance	7250	ohms
Transconductance	6500	μmhos
Plate Current	8.2	ma
Grid Voltage (Approx.) for plate current of 150 μamp	-5.5	volts

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length from Base Seat to Bulb Top (Excluding tip)	1-9/16" ± 3/32"
Maximum Diameter	7/8"
Bulb	T-6-1/2
Base	Small-Button Noval 9-Pin (JETEC No.E9-1)
Basing Designation for BOTTOM VIEW	9A

Pin 1-Plate of Unit No.2
 Pin 2-Grid of Unit No.2
 Pin 3-Cathode of Unit No.2
 Pin 4,9-Heater of Unit No.2
 Pin 5,9-Heater of Unit No.1



Pin 6-Plate of Unit No.1
 Pin 7-Grid of Unit No.1
 Pin 8-Cathode of Unit No.1
 Pin 9-Heater Mid-Tap

* Without external shield.

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MEDIUM-MU TWIN TRIODE

FREQUENCY DIVIDER IN COMPUTER SERVICE and "ON-OFF" CONTROL SERVICE

Values are for Each Unit

Maximum Ratings, Absolute Values:

PLATE VOLTAGE	330 max.	volts
GRID VOLTAGE:		
Negative bias value	150 max.	volts
PLATE DISSIPATION	2.4 max.	watts
Total for both units	4.4 max.	watts
DC CATHODE CURRENT	16.5 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode .	200#max.	volts
Heater positive with respect to cathode .	200#max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	165 max.	°C

Typical Operation in Computer Service:

	<i>Cutoff Condition</i>	<i>Conduction Condition</i>	
Plate Supply Voltage	150	150	volts
Plate Load Resistor	7200	7200	ohms
Plate Current	—	10.5	ma
Grid Voltage (Approx.) for grid current of 140 μ amp . .	—	less than 1	volt
Grid Voltage (Approx.) for plate current of 150 μ amp . .	-5.5	—	volts
Difference in Grid Voltage Between Units (For plate current of 150 μ amp per unit)	1.5	—	volts

Maximum Circuit Values:

Grid-Circuit Resistance:		
For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	<i>Note</i>	<i>Min.</i>	<i>Max.</i>	
Heater Current	1	0.207	0.243	amp
Amplification Factor (Each Unit) 1,2		39	55	
Grid Voltage for plate current of 150 μ amp (Each Unit) . . . 1,3		—	-7.5	volts
Difference in Grid Voltage Between Units (For plate current of 150 μ amp per unit) —		—	1.5	volts
Plate Current 1 (Each Unit) . . . 1,2		6	10.4	ma

* The dc component must not exceed 100 volts.



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MEDIUM-MU TWIN TRIODE

	Note	Min.	Max.	
Plate Current 2 (Each Unit) . .	1,4	9.75	—	ma
Reverse Grid Current (Each Unit)	1,5	—	1	μ amp
Heater-Cathode Leakage Current:				
Heater negative with respect to cathode	1,6	—	20	μ amp
Heater positive with respect to cathode	1,6	—	20	μ amp
Transconductance	1,2	5100	7900	μ mhos
Note 1: With 12.6 volts ac or dc on heater (series connected).				
Note 2: With plate supply voltage of 150 volts and cathode resistor for each cathode of 220 ohms adequately bypassed for a signal frequency of 60 cps. Each unit tested separately. Unit not under test biased to cutoff.				
Note 3: With plate supply voltage of 150 volts, grid supply voltage adjusted to give dc plate current of 150 microamperes, and plate load resistor of 7200 ohms. Each unit tested separately. Unit not under test biased to cutoff.				
Note 4: With plate supply voltage of 150 volts, grid supply voltage adjusted to give dc grid current of 140 microamperes, and plate load resistor of 7200 ohms. Each unit tested separately. Unit not under test biased to cutoff.				
Note 5: With plate supply voltage of 150 volts, cathode resistor for each cathode of 220 ohms, and grid-circuit resistance of 0.5 megohm. Each unit tested separately. Unit not under test biased to cutoff.				
Note 6: With 100 volts dc between heater and cathode and units connected in parallel.				

JUNE 14, 1954

TUBE DIVISION

TENTATIVE DATA 2

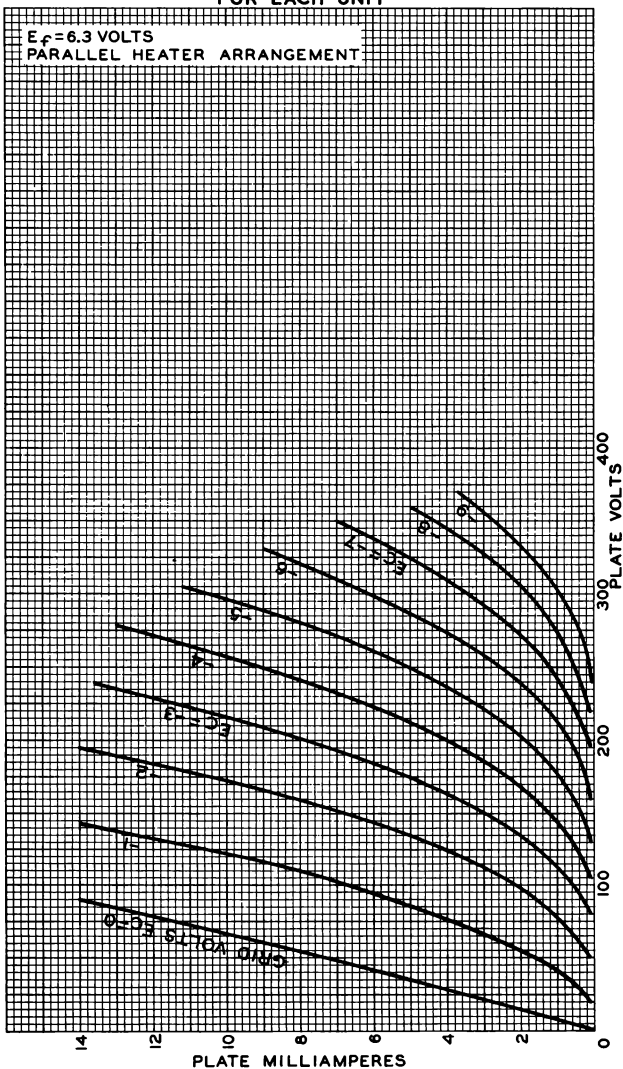
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5965



5965

AVERAGE PLATE CHARACTERISTICS FOR EACH UNIT



MAR. 4, 1954

TUBE DIVISION

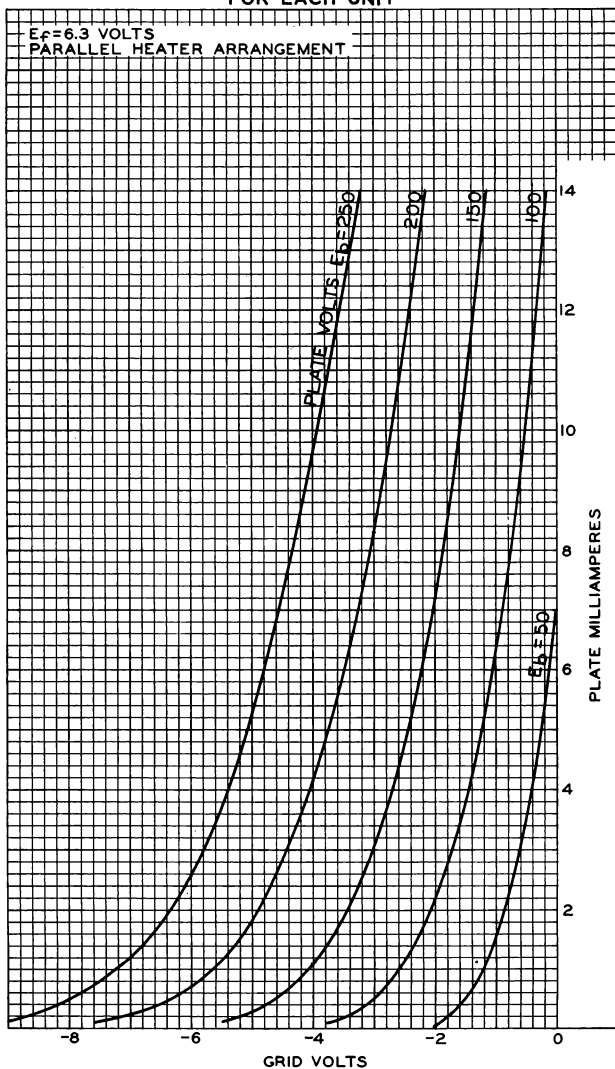
92CM-8261

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



5965

AVERAGE CHARACTERISTICS FOR EACH UNIT



MAR. 5, 1954

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

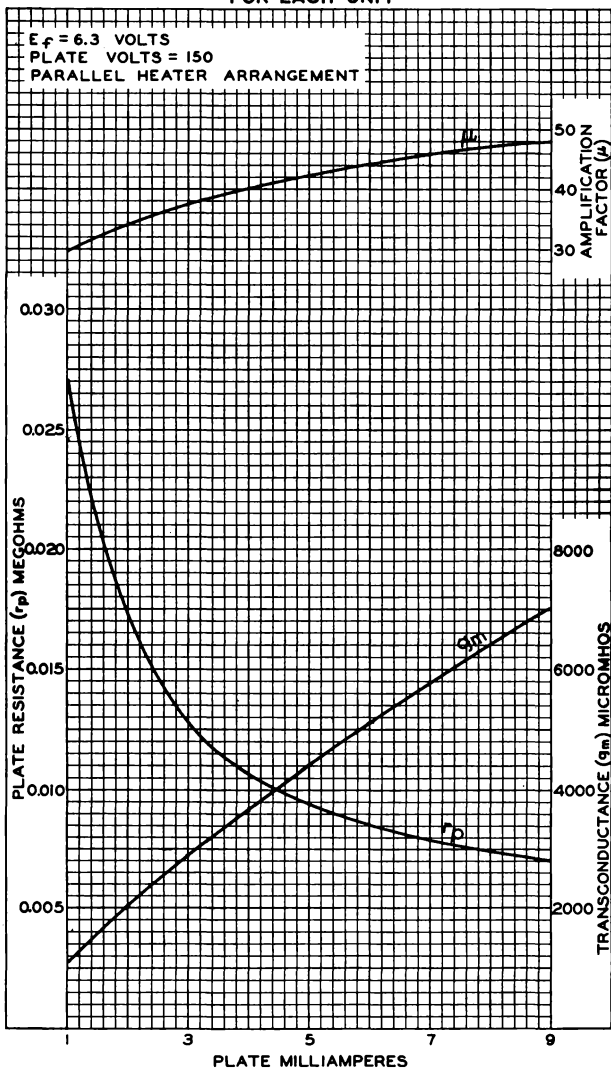
92CM-8262

5965



5965

AVERAGE CHARACTERISTICS FOR EACH UNIT



MAR. 8, 1954

TUBE DIVISION
 RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8265



6073

VOLTAGE REGULATOR

MINIATURE GLOW-DISCHARGE TYPE

Intended for applications where very stable characteristics and dependable performance under shock and vibration are paramount. The 6073 is a "premium" version of the 0A2.

6073
 PREMIUM TYPE
DATA**General:**

Cathode Cold

Mechanical:

Mounting Position Any

Maximum Overall Length 2-5/8"

Maximum Seated Length 2-3/8"

Length, Base Seat to Bulb Top (Excluding tip) . . . 2" $\pm$ 3/32"

Maximum Diameter 3/4"

Bulb T-5-1/2

Base Small-Button Miniature 7-Pin (JETEC No. E7-1)

Basing Designation for BOTTOM VIEW 5BQ

Pin 1 - Anode

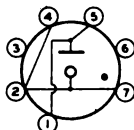
Pin 2 - Cathode

Pin 3 - Internal

Connection-

Do Not Use

Pin 4 - Cathode



Pin 5 - Anode

Pin 6 - Internal

Connection-

Do Not Use

Pin 7 - Cathode

Maximum Ratings, Absolute Values:

AVERAGE STARTING CURRENT (See note below) . . . 75 max. ma

DC CATHODE CURRENT { 30 max. ma

. { 5 min. ma

AMBIENT TEMPERATURE RANGE -55 to +90 °C

FREQUENCY 0 max. cps

Characteristics Range Values for Equipment Design:

	Min.	Av.	Max.	
DC Anode-Supply Voltage	185 [▲]	-	-	volts
Anode Breakdown Voltage	-	156	185●	volts
Anode Voltage Drop	140★	151	168●	volts
Regulation (5 to 30 ma)	-	2	6●	volts

Circuit Values:Shunt Capacitor - - 0.1 μ f

Series Resistor See note below

NOTE: The notes and circuit information shown under Type 0A2 are also applicable to the 6073.

▲, ●, ★: See next page.

MAY 1, 1952

TUBE DEPARTMENT

TENTATIVE DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6073



6073

VOLTAGE REGULATOR**Shock and Vibration Tests:**

These tests are made as indicated in the JAN Specifications JAN 1-A for Electron Tubes, May, 1946 under the sections as follows:

Section F-6b (9e) Shock Test:

Instantaneous Impact Acceleration 900 max. g

Section F-6b (9f) Vibration Test:

Vibrational Acceleration. 2.5 max. g

- ▲ Not less than indicated supply voltage should be provided to insure "starting" throughout tube life.
- Maximum individual tube value during life.
- ★ Minimum individual tube value during life.

MAY 1, 1952

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA



6074

VOLTAGE REGULATOR

MINIATURE GLOW-DISCHARGE TYPE

Intended for applications where very stable characteristics and dependable performance under shock and vibration are paramount. The 6074 is a "premium" version of the 0B2.

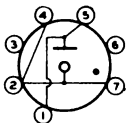
6074
 PREMIUM TYPE
DATA**General:**

Cathode. Cold

Mechanical:

Mounting Position. Any
 Maximum Overall Length. 2-5/8"
 Maximum Seated Length. 2-3/8"
 Length, Base Seat to Bulb Top (Excluding tip). . . 2" $\pm$ 3/32"
 Maximum Diameter. 3/4"
 Bulb. T-5-1/2
 Base. Small-Button Miniature 7-Pin (JETEC No.E7-1)
 Basing Designation for BOTTOM VIEW. 5BQ

Pin 1 - Anode
 Pin 2 - Cathode
 Pin 3 - Internal
 Connection-
 Do Not Use
 Pin 4 - Cathode



Pin 5 - Anode
 Pin 6 - Internal
 Connection-
 Do Not Use
 Pin 7 - Cathode

Maximum Ratings, Absolute Values:

AVERAGE STARTING CURRENT (See note below)	75 max.	ma
DC CATHODE CURRENT	{ 30 max.	ma
	{ 5 min.	ma
AMBIENT TEMPERATURE RANGE.	-55 to +90	°C
FREQUENCY.	0 max.	cps

Characteristics Range Values for Equipment Design:

	Min.	Av.	Max.	
DC Anode-Supply Voltage. . . .	133 [▲]	-	-	volts
Anode Breakdown Voltage. . . .	-	115	133 [●]	volts
Anode Voltage Drop	101 [★]	108	114 [●]	volts
Regulation (5 to 30 ma). . . .	-	1	4 [●]	volts

Circuit Values:

Shunt Capacitor. - - 0.1 μ f
 Series Resistor. See note below

NOTE: The notes and circuit information shown under Type 0A2 are also applicable to the 6074.

[▲], [●], [★]: See next page.

MAY 1, 1952

TUBE DEPARTMENT

TENTATIVE DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6074



6074

VOLTAGE REGULATOR

Shock and Vibration Tests:

These tests are made as indicated in the JAN Specifications JAN 1-A for Electron Tubes, May, 1946 under the sections as follows:

Section F-6b (9e) Shock Test:

Instantaneous Impact Acceleration 900 max. g

Section F-6b (9f) Vibration Test:

Vibrational Acceleration. 2.5 max. g

- ▲ Not less than indicated supply voltage should be provided to insure "starting" throughout tube life.
- Maximum individual tube value during life.
- ★ Minimum individual tube value during life.

MAY 1. 1952

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA



6080

6080

LOW-MU TWIN POWER TRIODE

GENERAL DATA

Heater, for Unipotential Cathodes:

Voltage $6.3 \pm 10\%$ ac or dc volts

Current 2.5 amp

Direct Interelectrode Capacitances (Approx.):

(Each Unit, without external shield)

Grid to Plate 8 μf Input 6 μf Output 2.2 μf

Heater to Cathode:

Triode Unit No.1 6.5 μf Triode Unit No.2 6 μf Grid of Unit No.1 to Grid of Unit No.2 0.5 μf

Plate of Unit No.1

to Plate of Unit No.2 2 μf Characteristics, Amplifier Class A_1 (Each Unit):

Plate-Supply Voltage 135 volts

Cathode-Bias Resistor 250 ohms

Amplification Factor 2

Plate Resistance 280 ohms

Transconductance 7000 μmhos

Plate Current 125 ma

Mechanical:

Mounting Position Any

Maximum Overall Length 4-1/16" ←

Maximum Seated Length 3-1/2" ←

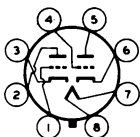
Maximum Diameter 1-23/32" •

Bulb T-12

Base Large-Wafer Octal 8-Pin with Sleeve and ←

External Barriers (JETEC No. B8-98)

Basing Designation for BOTTOM VIEW 8BD

Pin 1-Grid of
Unit No.2Pin 2-Plate of
Unit No.2Pin 3-Cathode of
Unit No.2Pin 4-Grid of
Unit No.1Pin 5-Plate of
Unit No.1Pin 6-Cathode of
Unit No.1

Pin 7-Heater

Pin 8-Heater

DC AMPLIFIER

Values are for Each Unit

Maximum Ratings, Absolute Values:

PLATE VOLTAGE 250 max. volts

PLATE CURRENT 125 max. ma

PLATE DISSIPATION 13 max. watts

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode 300 max. volts

Heater positive with respect to cathode 300 max. volts

← indicates a change

AUG. 1, 1953

TUBE DEPARTMENT

DATA 1

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6080



6080

LOW-MU TWIN POWER TRIODE

BULB TEMPERATURE[•] 200 max. °C

Maximum Circuit Values:

Grid-Circuit Resistance:

For cathode-bias operation 1.0 max. megohm
 For fixed-bias operation[□] 0.1 max. megohm
 For combined fixed and
 cathode-bias operation[★] 0.1 max. megohm

BOOSTER SCANNING SERVICE

Values are for Each Unit

Maximum Ratings, Absolute Values:

For operation in a 525-line, 30-frame system[▲]

PEAK NEGATIVE-PULSE PLATE VOLTAGE[•] 3000 max. volts
 PEAK NEGATIVE-PULSE GRID VOLTAGE 2300 max. volts
 DC PLATE CURRENT 125 max. ma
 PLATE DISSIPATION 13 max. watts
 PEAK HEATER-CATHODE VOLTAGE:
 Heater negative with respect to cathode[•] 300 max. volts
 Heater positive with respect to cathode. 300 max. volts
 BULB TEMPERATURE[•] 200 max. °C

Maximum Circuit Values (For maximum rated conditions):

Grid-Circuit Resistance:

For cathode-bias operation 1.0 max. megohm
 For fixed-bias operation not recommended

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	Min.	Max.	
Heater Current	1	2.26	2.74	amp
Amplification Factor				
(Each Unit)	1, 2	1.4	2.6	
Plate Current (Each Unit).	1, 2	100	150	ma
Transconductance				
(Each Unit)	1, 2	5800	8200	μmhos
Reverse Grid Current				
(Units in Parallel)	1, 3	—	4	μamp

Note 1: With 6.3 volts ac or dc on heater.

Note 2: With plate-supply voltage of 135 volts, and cathode-bias resistor of 250 ohms in each cathode (both triode units operating).

Note 3: With plate-supply voltage of 135 volts, grid resistor of 1 megohm in each grid and cathode-bias resistor of 250 ohms in each cathode (both triode units operating).

• At hottest point on bulb surface.

□ When fixed bias is used, the plate circuit should contain a protective resistance to provide a minimum drop of 15 volts dc at the normal operating conditions.

★, ▲, •: See next page.

→ indicates a change

AUG. 1, 1953

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA 1



6080

6080

LOW-MU TWIN POWER TRIODE

- ★ When combined fixed- and cathode-bias is used, the cathode-bias portion should have a minimum value of 7.5 volts dc at the normal operating conditions.
- ▲ As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations", Federal Communications Commission.
- The duration of the voltage pulse must not exceed 15 per cent of one horizontal scanning cycle. In a 525-line, 30-frame system, 15 per cent of one horizontal scanning cycle is 10 microseconds.
- Operation of this tube is not recommended with a damper pulse between heater and cathode.

SPECIAL RATINGS & PERFORMANCE DATA

Shock Rating:

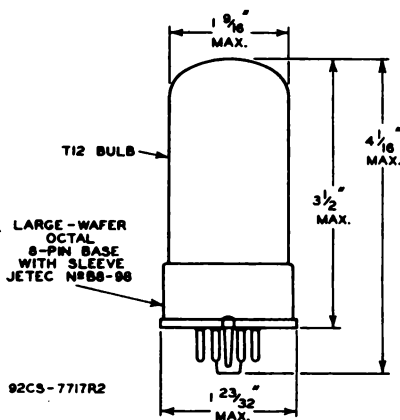
Impact Acceleration 450 max. g
Tubes are held rigid in four different positions in a Navy Type, High Impact (flyweight) Shock Machine and are subjected to 450 g impact acceleration.

Fatigue Rating:

Vibrational Acceleration 2.5 max. g
Tubes are rigidly mounted and subjected in each of three positions to 2.5 g vibrational acceleration at 25 cycles per second for 32 hours.

Low-Frequency Vibration Performance:

RMS Output Voltage 200 max. mv
Under the following conditions and with units connected in parallel: Heater voltage of 6.3 volts, plate voltage supply of 135 volts, dc grid voltage of -7 volts, plate load resistance of 2000 ohms, and vibrational acceleration of 2.5 g at 25 cycles per second.



← indicates a change

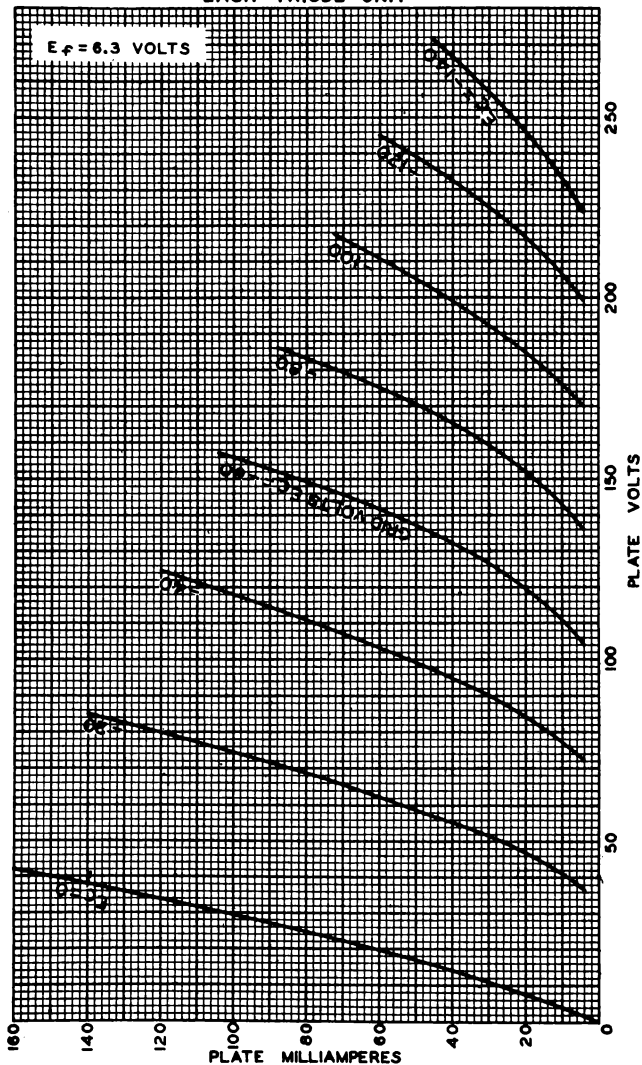
AUG. 1, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA 2



6080
AVERAGE PLATE CHARACTERISTICS
EACH TRIODE UNIT



OCT. 19, 1951

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7695

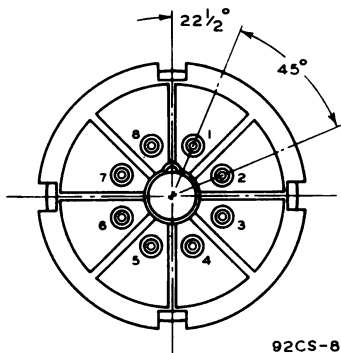
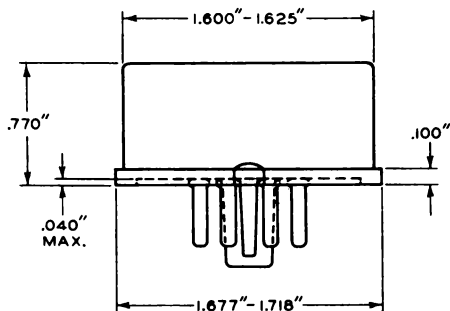


6080

6080

LOW-MU TWIN POWER TRIODE

LARGE-WAFER OCTAL BASE
WITH EXTERNAL BARRIERS AND SLEEVE
JETEC No. 88-98



92CS-8011

AUG. 1, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-8011



6082

6082

LOW-MU TWIN POWER TRIODE

GENERAL DATA

Heater, for Unipotential Cathodes:

Voltage 26.5 $\pm$ 10% . . . ac or dc volts

Current 0.6 amp

Direct Interelectrode Capacitances (Approx.):

(Each Unit, without external shield)

Grid to Plate 8 $\mu\mu\text{f}$ Input 6 $\mu\mu\text{f}$ Output 2.2 $\mu\mu\text{f}$

Heater to Cathode:

Triode Unit No.1 13 $\mu\mu\text{f}$ Triode Unit No.2 13 $\mu\mu\text{f}$ Grid of Unit No.1 to Grid of Unit No.2 . . . 0.5 $\mu\mu\text{f}$

Plate of Unit No.1

to Plate of Unit No.2 2 $\mu\mu\text{f}$ Characteristics, Amplifier Class A₁ (Each Unit):

Plate-Supply Voltage 135 volts

Cathode-Bias Resistor 250 ohms

Amplification Factor 2

Plate Resistance 280 ohms

Transconductance 7000 μmhos

Plate Current 125 ma

Mechanical:

Mounting Position Any

Maximum Overall Length 4-1/16"

Maximum Seated Length 3-1/2"

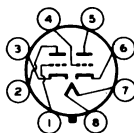
Maximum Diameter 1-23/32"

Bulb T-12

Base Large-Wafer Octal 8-Pin with Sleeve and

External Barriers (JETEC No.88-98)

Basing Designation for BOTTOM VIEW 8BD

Pin 1-Grid of
Unit No.2Pin 2-Plate of
Unit No.2Pin 3-Cathode of
Unit No.2Pin 4-Grid of
Unit No.1Pin 5-Plate
Unit No.1Pin 6-Cathode of
Unit No.1

Pin 7-Heater

Pin 8-Heater

DC AMPLIFIER

Values are for Each Unit

Maximum Ratings, Absolute Values:

PLATE VOLTAGE 250 max. volts

PLATE CURRENT 125 max. ma

PLATE DISSIPATION 13 max. watts

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode . . . 300 max. volts

Heater positive with respect to cathode . . . 300 max. volts

← Indicates a change

AUG. 1, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA 1

6082



6082

LOW-MU TWIN POWER TRIODE

BULB TEMPERATURE° 200 max. °C

Maximum Circuit Values:

Grid-Circuit Resistance:

For cathode-bias operation 1.0 max. megohm
 For fixed-bias operation[□] 0.1 max. megohm
 For combined fixed- and
 cathode-bias operation^{*} 0.1 max. megohm

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	Min.	Max.	
Heater Current	1	0.55	0.65	amp
Amplification Factor (Each Unit)	1,2	1.4	2.6	
Plate Current (Each Unit)	1,2	100	150	ma
Transconductance (Each Unit)	1,2	5800	8200	μmhos
Reverse Grid Current (Units in Parallel). 1,3		-	4	μamp

Note 1: With 26.5 volts ac or dc on heater.

Note 2: With plate-supply voltage of 135 volts, and cathode-bias resistor of 250 ohms in each cathode (both triode units operating).

Note 3: With plate-supply voltage of 135 volts, grid resistor of 1 megohm in each grid and cathode-bias resistor of 250 ohms in each cathode (both triode units operating).

● At hottest point on bulb surface.

□ When fixed bias is used, the plate circuit should contain a protective resistance to provide a minimum drop of 15 volts dc at the normal operating conditions.

* When combined fixed- and cathode-bias is used, the cathode-bias portion should have a minimum value of 7.5 volts dc at the normal operating conditions.

SPECIAL RATINGS & PERFORMANCE DATA

Shock Rating:

Impact Acceleration 450 max. g
 Tubes are held rigid in four different positions in a Navy Type, High Impact (flyweight) Shock Machine and are subjected to 450 g impact acceleration.

Fatigue Rating:

Vibrational Acceleration 2.5 max. g
 Tubes are rigidly mounted and subjected in each of three positions to 2.5 g vibrational acceleration at 25 cycles per second for 32 hours.

Low-Frequency Vibration Performance:

RMS Output Voltage 200 max. mv
 Under the following conditions and with units connected in parallel: Heater voltage of 26.5 volts, plate voltage

→ Indicates a change

AUG. 1, 1953

TUBE DEPARTMENT

DATA 1

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



6082

6082

LOW-MU TWIN POWER TRIODE

supply of 135 volts, dc grid voltage of -7 volts, plate load resistance of 2000 ohms, and vibrational acceleration of 2.5 g at 25 cycles per second.

Outline Drawing and
Average Plate Characteristics Curve
for the 6082 are the same as
shown for Type 6080



6101

MEDIUM-MU TWIN TRIODE

MINIATURE TYPE

Intended for applications at altitudes up to 55000 feet and where dependable performance under shock and vibration is paramount.

6101
PREMIUM TYPE
GENERAL DATA**Electrical:**

Heater, for Unipotential Cathode:

Voltage $6.3 \pm 10\%$ ac or dc volts

Current 0.45 amp

Direct Interelectrode Capacitances (Each Unit, approx.)*:

Grid to Plate 1.5 $\mu\mu\text{f}$ Input 2.0 $\mu\mu\text{f}$ Output 0.4 $\mu\mu\text{f}$ Heater to Cathode 6.0 $\mu\mu\text{f}$ **Characteristics, Class A₁ Amplifier:**

Plate Supply Voltage 100 volts

Cathode-Bias Resistor 50 Ω ohms

Amplification Factor 38

Plate Resistance 6300 ohms

Transconductance 6000 μmhos

Plate Current 8.5 ma

Mechanical:

Mounting Position Any

Maximum Overall Length 2-1/8"

Maximum Seated Length 1-7/8"

Length, Base Seat to Bulb Top (Excluding tip) . . 1-1/2" $\pm 3/32$ "

Maximum Diameter 3/4"

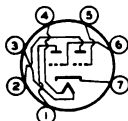
Bulb T-5-1/2

Base Small-Button Miniature 7-Pin (JETEC No.E7-1)

BOTTOM VIEWPin 1-Plate of
Unit No.2Pin 2-Plate of
Unit No.1

Pin 3-Heater

Pin 4-Heater

Pin 5-Grid of
Unit No.1Pin 6-Grid of
Unit No.2

Pin 7-Cathode

AMPLIFIER - Class A₁*Values are for each unit***Maximum Ratings, Absolute Values:**

*For Pressures Down
to 55 ± 5 mm of Hg***

PLATE VOLTAGE 330 max. volts

* With no external shield.

** Corresponds to altitude of about 55000 feet.

Value is common to both units operating at the specified conditions.

OCT. 1, 1953

TUBE DEPARTMENT
 RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA 1

6101



6101

MEDIUM-MU TWIN TRIODE

PLATE DISSIPATION	0.85 max.	watt
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	180 max.	volts
Heater positive with respect to cathode	180 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	165 max.	°C

Maximum Circuit Values (For maximum rated conditions):

Grid-Circuit Resistance:		
For fixed-bias operation	Not recommended	
For cathode-bias operation	0.5 max.	megohm

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	Min.	Max.	
Heater Current	1	0.420	0.480	amp
Grid-to-Plate Capacitance (Each Unit)	2	1.2	1.8	μf
Grid-to-Cathode Capacitance (Each Unit)	2	1.4	2.8	μf
Plate-to-Cathode Capacitance (Unit No.1)	2	0.25	0.65	μf
Plate-to-Cathode Capacitance (Unit No.2)	2	0.25	0.55	μf
Heater-to-Cathode Capacitance	2	4.0	8.0	μf
Amplification Factor	1,3	28	48	
Plate Current (1)	1,4	6.5	11.5	ma
Plate Current (2)	1,5	-	200	μamp
Plate Current (3)	1,7	5	-	μamp
Transconductance (1)	1,4	4500	7500	μmhos
Transconductance (2)	6,4	▲	-	μmhos
Reverse Grid Current (1)	1,8	-	0.5	μamp
Reverse Grid Current (2)	9,10	-	1.0	μamp
Heater-Cathode Leakage Current:				
Heater negative with respect to cathode	1,11	-	10	μamp
Heater positive with respect to cathode	1,11	-	10	μamp
Leakage Resistance Per Unit:				
Between Grid and All Other Electrodes Tied Together	1,12	100	-	megohms
Between Plate and All Other Electrodes Tied Together	1,13	100	-	megohms

Note 1: With 6.3 volts ac or dc on heater.

Note 2: With no external shield.

Note 3: With plate supply voltage of 100 volts, cathode-bias resistor of 50 ohms common to both units, and a cathode bypass capacitor of 1000 μf. Each unit tested separately and with both units operating.

Note 4: With plate supply voltage of 100 volts and cathode-bias resistor of 50 ohms common to both units. Each unit tested separately and with both units operating.

OCT. 1, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA 1



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MEDIUM-MU TWIN TRIODE

- Note 5: With dc plate voltage of 250 volts, and dc grid voltage of -14.5 volts. Each unit tested separately and with both units operating.
- Note 6: With 5.7 volts ac or dc on heater.
- Note 7: With plate supply voltage of 250 volts and dc grid voltage of -10.5 volts. Each unit tested separately and with both units operating.
- Note 8: With plate supply voltage of 250 volts, grid-circuit resistance of 1.0 megohm common to both units, and cathode-bias resistor of 500 ohms common to both units. Plate of unit No.1 tied to plate of unit No.2; grid of unit No.1 tied to grid of unit No.2.
- Note 9: With 7.0 volts ac or dc on heater.
- Note 10: With plate supply voltage of 100 volts, grid-circuit resistance of 1 megohm common to both units and cathode-bias resistor of 50 ohms common to both units. Plate of unit No.1 tied to plate of unit No.2; grid of unit No.1 tied to grid of unit No.2.
- Note 11: With 100 volts dc between heater and cathode.
- Note 12: With grid 100 volts negative with respect to all other electrodes tied together.
- Note 13: With plate 300 volts negative with respect to all other electrodes tied together.

SPECIAL RATINGS & PERFORMANCE DATA**Shock Rating:**

Impact Acceleration 500 max. g

This test is performed on a sample lot of tubes from each production run to determine ability of tube to withstand the specified impact acceleration. Tubes are held rigid in four different positions in a Navy Type, High-Impact (flyweight) Shock Machine and are subjected to 20 blows at a hammer angle of 30° (equivalent to the specified maximum impact acceleration). At the end of this test, tubes will not show permanent or temporary shorts or open circuits, and are required to meet established limits for vibration, heater-cathode leakage current, and transconductance.

Fatigue Rating:

Vibrational Acceleration 2.5 max. g

This test is performed on a sample lot of tubes from each production run to determine ability of tube to withstand the specified vibrational acceleration. Tubes are rigidly mounted and subjected in each of three positions to 2.5 g vibrational acceleration at 60 cycles per second for 32 hours. At the end of this test, tubes will not show permanent or temporary shorts or open circuits, and are required to meet established limits for fatigue, heater-cathode leakage current, and transconductance.

Low-Frequency Vibration Performance:

RMS Output Voltage 25 max. millivolts

This test is performed on a sample lot of tubes from each production run to determine ability of tube to withstand low-frequency vibration of its elements with consequent



MEDIUM-MU TWIN TRIODE

generation of audio noise as determined by the measured rms output voltage. Plate of unit No.1 tied to plate of unit No.2 and grid of unit No.1 tied to grid of unit No.2; dc plate voltage of 250 volts, dc grid voltage of -8 volts, plate load resistance of 20000 ohms, and vibrational acceleration of 2.5 g at 25 cps.

Audio-Frequency Noise and Microphonic Performance:

RMS Output Voltage 70 max. millivolts

This test is performed on a sample lot of tubes from each production run to determine susceptibility of tube to movement of its elements when tapped and consequent generation of audio noise as determined by the measured rms output voltage. Plate of unit No.1 tied to plate of unit No.2, grid of unit No.1 tied to grid of unit No.2, plate supply voltage of 100 volts, grid-circuit resistance of 0.1 megohm common to both units, cathode-bias resistor of 50 ohms common to both units, and plate load resistance of 10000 ohms.

Glass Strain Test:

This test is performed on a sample lot of tubes from each production run to check for tubes which may have been improperly processed. Tubes are completely submerged in boiling water (97°C to 100°C) for a period of 15 seconds and then immediately submerged in ice water (0°C to 3°C). Tubes will withstand this treatment without loss of vacuum.

Shorts and Continuity Test:

This test is performed on a sample lot of tubes from each production run. In this test a tube is considered inoperative if it shows a permanent or temporary short or open circuit, or a value of reverse grid current in excess of 1.0 microampere under the conditions specified in the CHARACTERISTICS RANGE VALUES for reverse grid current (1).

1-Hour Stability Life Performance:

This test is performed on a sample lot of tubes from each production run to insure that the tubes have been properly stabilized. With both units operating, each unit is checked for variation in transconductance under conditions of maximum rated plate dissipation. At the end of 1 hour, the value of transconductance of each unit is read. The variation in transconductance from the 0-hour reading will not exceed 12 per cent.

100-Hour Life Performance:

This test is performed on a sample lot of tubes from each production run under conditions of maximum rated plate dissipation to insure a low percentage of early inopera-



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MEDIUM-MU TWIN TRIODE

tives. At the end of 100 hours, a tube is considered inoperative if it shows a permanent or temporary short or open circuit, or a value of reverse grid current in excess of 1.0 microampere under the conditions specified in CHARACTERISTICS RANGE VALUES for reverse grid current (1).

500-Hour Average Life Performance:

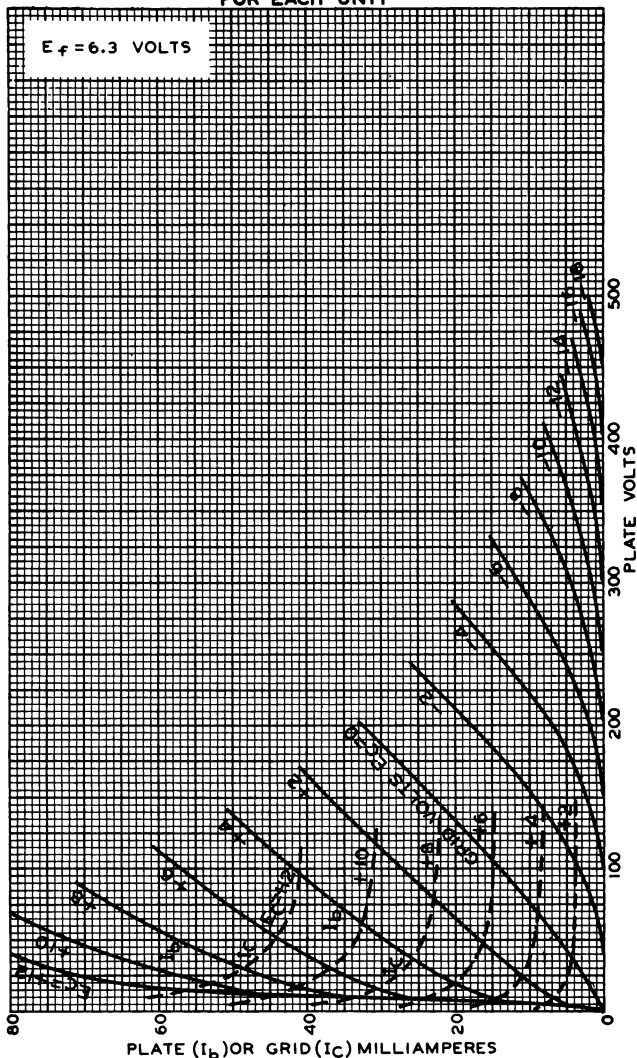
This 500-hour test is made on a sample lot of tubes from each production run to insure high quality of the individual tube and to guard against epidemic failures of any of the characteristics indicated below. With both units operating, each unit is life tested separately at room temperature under the following conditions: heater voltage of 6.3 volts ac or dc, plate supply voltage of 100 volts, dc heater-cathode voltage (heater positive with respect to cathode) of 180 volts, and cathode bias resistor (common to both units) of 50 ohms. At the end of 500 hours, the tubes will not show permanent shorts or open circuits and will be criticized for the total number of defects in the sample lot and for the number of tubes failing to pass the established limits of heater current, transconductance with 6.3 volts ac or dc on heater, transconductance with 5.7 volts ac or dc on heater, plate current (1), reverse grid current (2), heater-cathode leakage current, and leakage resistance per unit.

6101



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AVERAGE PLATE CHARACTERISTICS FOR EACH UNIT



JULY 13, 1953

TUBE DEPARTMENT

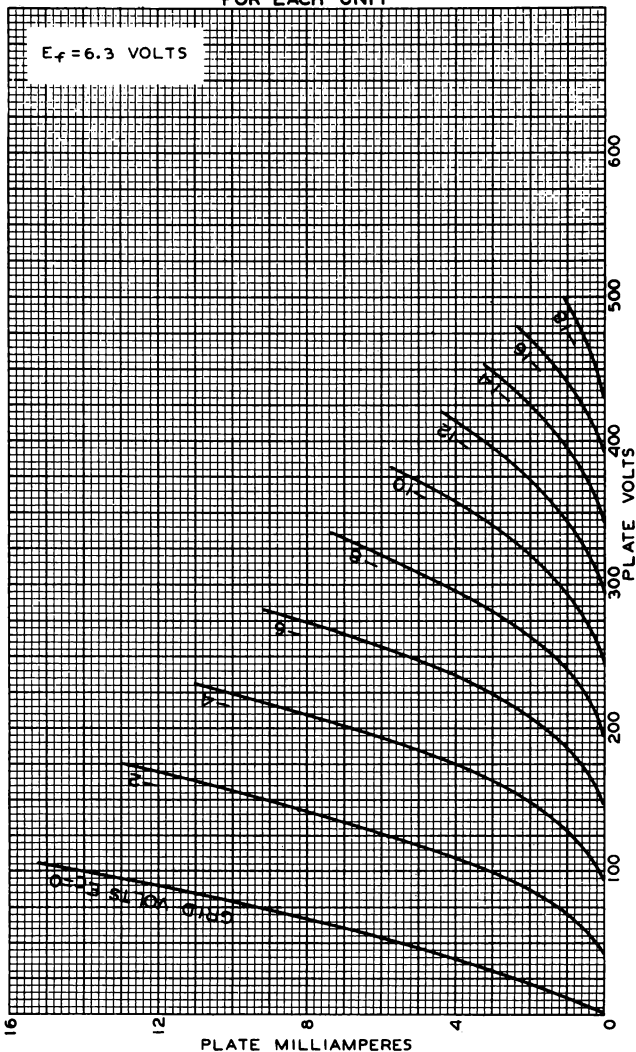
92CM-8034

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



6101

AVERAGE PLATE CHARACTERISTICS FOR EACH UNIT



JULY 13, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

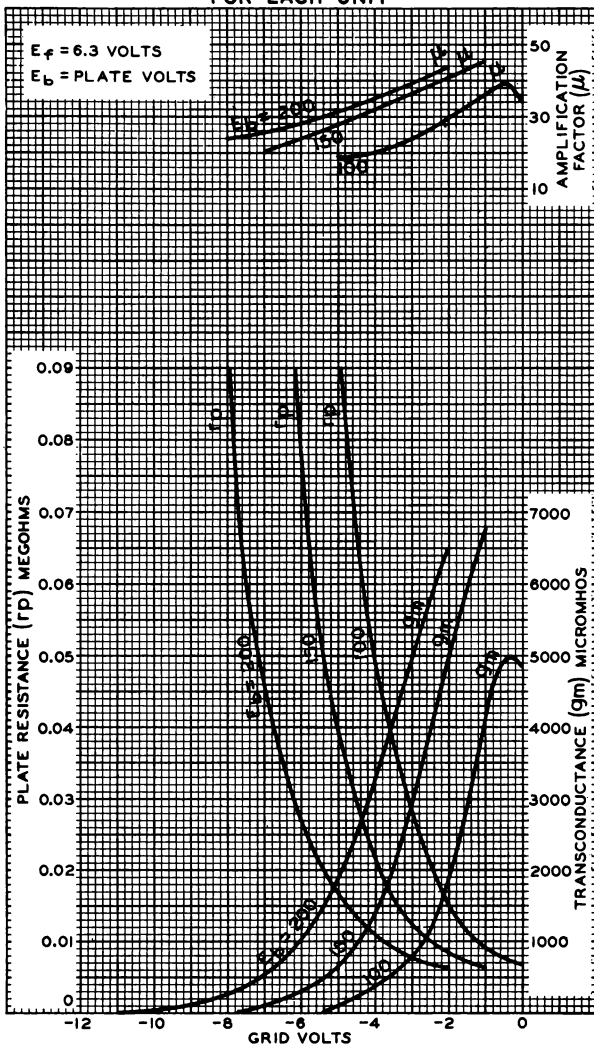
92CM-8033

6101



6101

AVERAGE CHARACTERISTICS FOR EACH UNIT



JULY 13, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8032



6173

UHF DIODE

"PENCIL TYPE" FOR PULSE-DETECTION SERVICE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage $6.3 \pm 10\%$ ac or dc volts

Current 0.135 amp

Resonant Freq. (Approx.) 1600 Mc

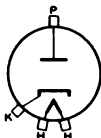
Direct Interelectrode Capacitance (Approx.):

Plate to Cathode 1.1 $\mu\mu\text{f}$

Mechanical:

Terminal Connections:

H—Heater Leads

P—Plate Cylinder
(Adjacent to
Pinch-off)K—Cathode Cylinder
(Adjacent to
Heater Leads)

Mounting Position Any

Dimensions See Outline Drawing

PULSE-DETECTION AND
PULSE-POWER-MEASURING SERVICE^A

Maximum Ratings, Absolute Values:

PEAK INVERSE PLATE VOLTAGE 1000 max. volts

PEAK PULSE PLATE VOLTAGE 150 max. volts

PEAK PULSE PLATE CURRENT 1.0 max. amp

AVERAGE PLATE CURRENT 1 max. ma.

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode 90 max. volts

Heater positive with respect to cathode 90 max. volts

SEAL TEMPERATURE (Plate or Cathode) 175 max. °C

HALF-WAVE RECTIFIER

Maximum Ratings, Absolute Values:

PEAK INVERSE PLATE VOLTAGE 375 max. volts

PEAK PLATE CURRENT 50 max. ma

HOT-SWITCHING TRANSIENT PLATE CURRENT*

For duration of 0.2 second maximum 250 max. ma

DC OUTPUT CURRENT 5.5 max. ma

(continued on next page)

^A In this class of service, the heater should be allowed to warm up for a minimum of 60 seconds before plate voltage is applied in order to allow the cathode to reach normal operating temperature and to be able to supply the high peak plate currents encountered in this class of service.

* A minimum plate-load impedance (including the source impedance) of 300 ohms is required to limit the hot-switching transient plate current and thereby prevent damage to the tube when the plate voltage is applied.

JULY 1, 1952

TUBE DEPARTMENT

TENTATIVE DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

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UHF DIODE

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode . .	90 max.	volts
Heater positive with respect to cathode . .	90 max.	volts
SEAL TEMPERATURE (Plate or Cathode).	175 max.	°C

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	Min.	Max.	
Heater Current	1	0.123	0.143	amp
Plate-to-Cathode Capacitance	—	0.8	1.4	μμf
Tube Voltage Drop.	1,2	—	15	volts

Note 1: With 6.3 volts ac or dc on heater.

Note 2: With peak plate current of 50 milliamperes provided by an applied dc voltage. Tube drop is measured by a voltmeter connected between plate and cathode.

INSTALLATION CONSIDERATIONS

Connections to the cathode cylinder and plate cylinder should be made by flexible spring contacts only. The connectors must make firm, large-surface contact, yet must be sufficiently flexible so that no part of the tube is subjected to strain. Unless this recommendation is observed, the glass-to-metal seals may be damaged.

The *heater* leads of the 6173 fit the Cinch Socket No. 54A16325. They should not be soldered to circuit elements. The heat of the soldering operation may crack the glass seals of the heater leads and damage the tube.

JULY 1, 1952

TUBE DEPARTMENT

TENTATIVE DATA

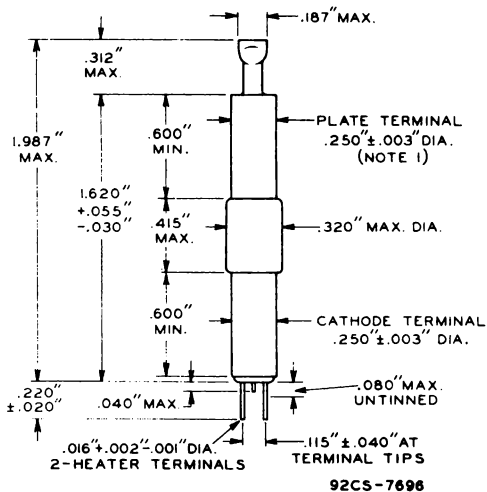
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UHF DIODE



NOTE 1: ECCENTRICITY OF ϕ (AXIS) OF PLATE TERMINAL WITH RESPECT TO THE ϕ (AXIS) OF THE CATHODE TERMINAL IS 0.008".

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UHF DIODE

OPERATING CONSIDERATIONS

The *Pulse Rating Chart* shown on the facing page represents graphically the relationships between pulse duration, pulse repetition rate, and peak pulse plate current. This Chart gives the equipment designer a wide choice of operating parameters within the tube's ratings.

Dotted boundary line "ABC" is the locus of the maximum peak pulse plate current values for various pulse durations. In most applications, two of the three parameters shown in the Pulse Rating Chart are known. Knowing any two parameters, the equipment designer can select from the Chart the maximum allowable value of the third parameter. For example, if an application requires a 1.0-microsecond pulse and a pulse repetition rate of 1000 per second, the maximum allowable peak pulse plate current is 1.0 ampere. Since the pulse repetition rate of 1000 is a maximum value for a pulse duration of 1.0 microsecond, it follows that any pulse repetition rate up to 1000 may be used under these conditions. If a longer pulse duration is required, e.g., 1.5 microseconds, and the same pulse repetition rate of 1000 is required, the maximum allowable peak pulse plate current is 0.67 ampere.

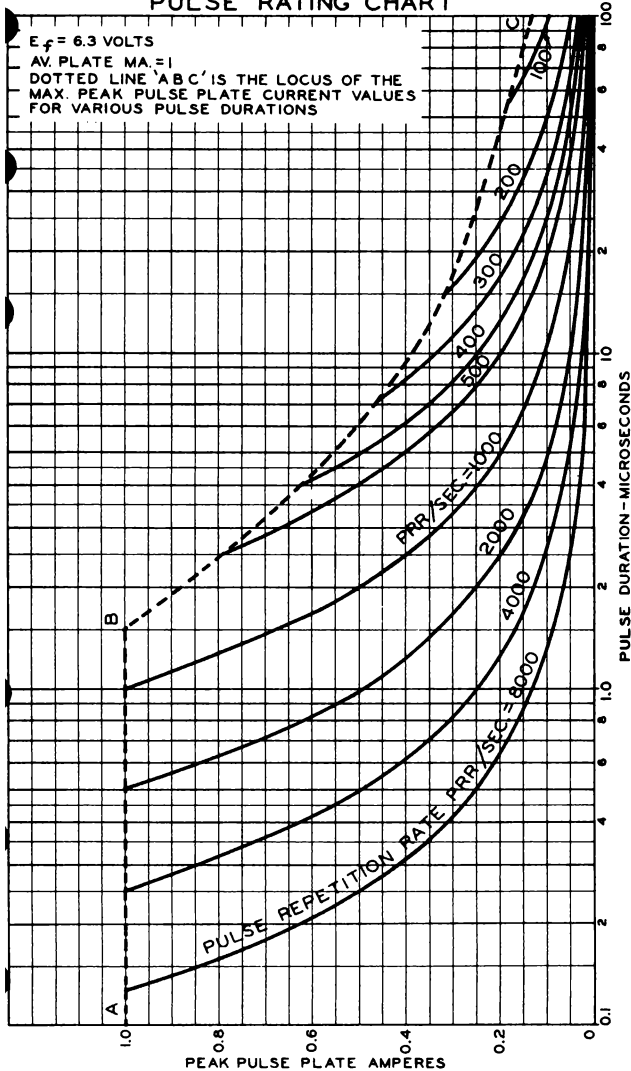
In applications where groups of pulses are employed, the equipment designer can total the pulse duration of the individual pulses in any one group and then treat the pulse duration of the group as a single wide pulse.



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PULSE RATING CHART



JAN. 4, 1952

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RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

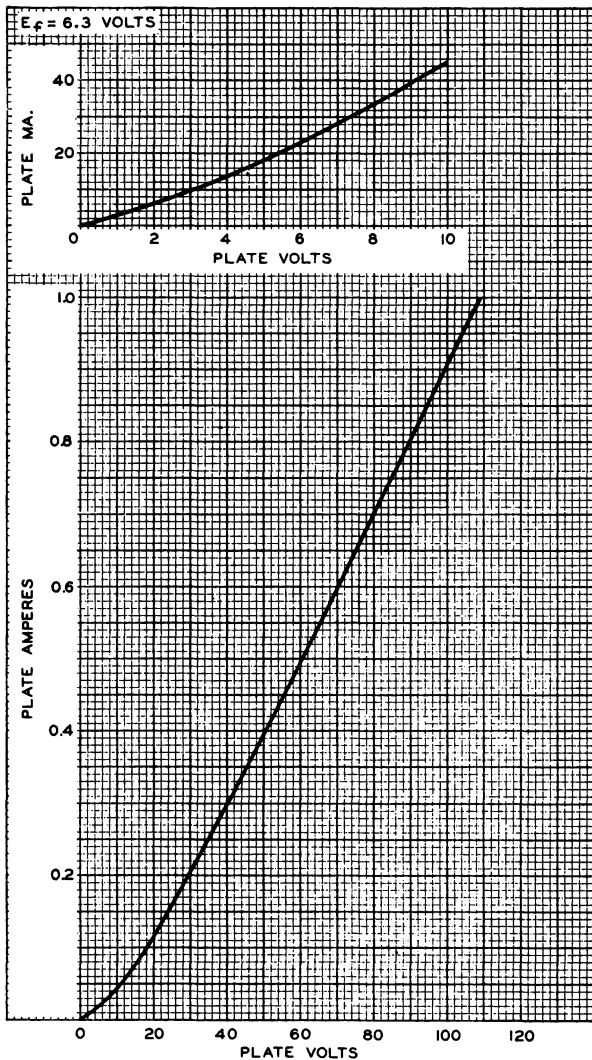
92CM-7727

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AVERAGE PLATE CHARACTERISTICS



JAN. 4, 1952

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RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7726

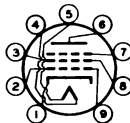


6197

6197

POWER PENTODEFOR "ON-OFF" CONTROL APPLICATIONS INVOLVING
LONG PERIODS OF OPERATION UNDER CUTOFF CONDITIONS**GENERAL DATA****Electrical:**

Heater, Pure Tungsten, for Unipotential Cathode:

Voltage 6.3 ± 5% ac or dc volts
Current at 6.3 volts 0.65 ampDirect Interelectrode Capacitances
(Approx. with no external shield):Grid No.1 to Plate 0.125 μf
Grid No.1 to Cathode and Heater 11.5 μf
Plate to Cathode and Heater 5.0 μf
Heater to Cathode 8.5 μf **Characteristics, Class A₁ Amplifier:**Heater Voltage 6.3 volts
Plate Voltage 250 volts
Grid No.3 Connected to Cathode at Socket
Grid-No.2 Voltage 150 volts
Grid-No.1 Voltage -3 volts
Mu-Factor, Grid No.2 to Grid No.1 22
Plate Resistance 90000 ohms
Transconductance 11000 μmhos
Plate Current 30 ma
Grid-No.2 Current 7 ma
Maximum Plate Current for grid-No.1
voltage of -12 volts 100 μamp **Mechanical:**Mounting Position Vertical; Horizontal operation permitted if
pins No.3 and No.8 are in a vertical plane
Maximum Overall Length 2-5/8"
Maximum Seated Length 2-3/8"
Length, Base Seat to Bulb Top (Excluding tip) 2" ± 3/32"
Maximum Diameter 7/8"
Bulb T-6-1/2
Base Small-Button Noval 9-Pin (JETEC No.E9-1)**BOTTOM VIEW**Pin 1: Cathode
Pin 2: Grid No.1
Pin 3: Grid No.2
Pin 4: Heater
Pin 5: HeaterPin 6: Plate
Pin 7: Grid No.3,
Int. Shield
Pin 8: Grid No.2
Pin 9: Grid No.1**FREQUENCY DIVIDER IN COMPUTER SERVICE
and "ON-OFF" CONTROL SERVICE****Maximum Ratings, Absolute Values:**PLATE VOLTAGE 300 max. volts
GRID-No.3 (SUPPRESSOR) VOLTAGE 0 max. volts

MARCH 1, 1954

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA



POWER PENTODE

GRID-No.2 (SCREEN) VOLTAGE	250 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE	-50 max.	volts
PLATE DISSIPATION	7.5 max.	watts
GRID-No.2 INPUT	2.5 max.	watts
CATHODE CURRENT	50 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	180*max.	volts
Heater positive with respect to cathode	180*max.	volts
BULB TEMPERATURE (At hottest point on bulb surface)	200 max.	°C

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:

For fixed-bias operation	0.1 max.	megohm
For cathode-bias operation	0.5 max.	megohm

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	Min.	Max.	
Heater Current	1	0.61	0.69	amp
Mu-Factor, Grid No.2				
to Grid No.1	1,2	19	25	
Plate Current (1).	1,3	26	46	ma
Plate Current (2).	1,4	20	40	ma
Plate Current (3).	1,5	-	100	μamp
Grid-No.2 Current	1,4	5	9	ma
Reverse Grid-No.1 Current	1,6	-	2	μamp
Heater-Cathode Leakage Current:				
Heater negative with respect to cathode	* 1,7	-	40	μamp
Heater positive with respect to cathode	1,7	-	40	μamp
Transconductance	1,4	9000	13000	μmhos

Note 1: With 6.3 volts ac or dc on heater.

Note 2: With grid No.3 tied to cathode, grid No.2 tied to plate, plate voltage of 150 volts, grid-No.2 voltage of 150 volts, and grid-No.1 voltage of -3 volts.

Note 3: With plate voltage of 50 volts, grid No.3 tied to cathode, grid No.2 voltage of 100 volts, and grid-No.1 voltage of 0 volts.

Note 4: With plate voltage of 250 volts, grid No.3 connected to cathode, grid-No.2 voltage of 150 volts, and grid-No.1 voltage of -3 volts.

Note 5: With plate voltage of 250 volts, grid No.3 connected to cathode, grid-No.2 voltage of 150 volts, and grid-No.1 voltage of -12 volts.

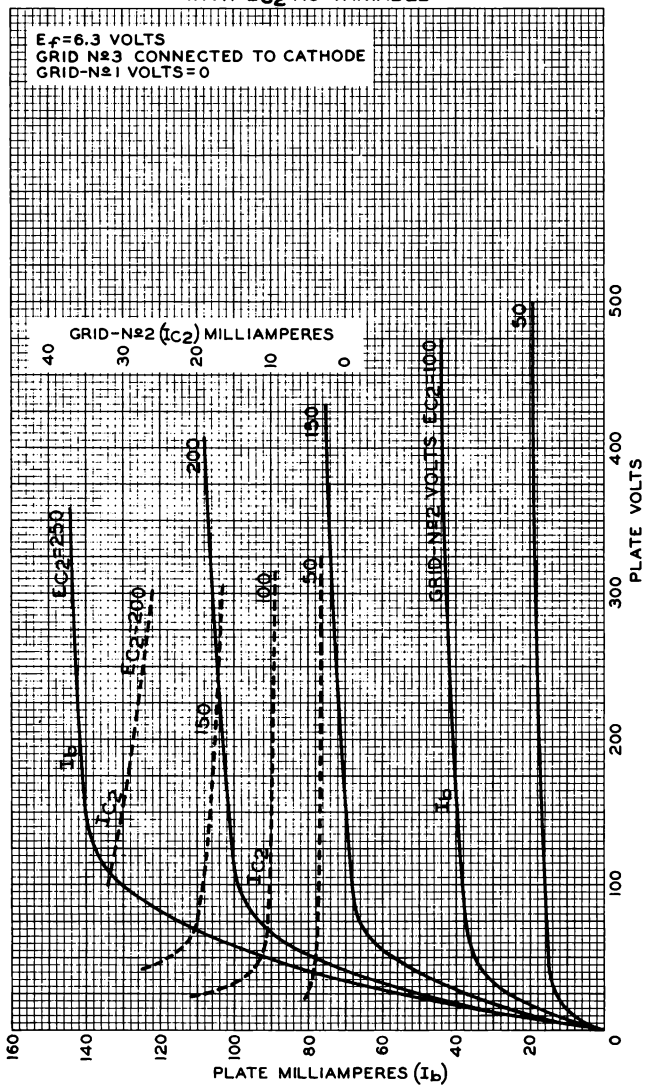
Note 6: With plate voltage of 250 volts, grid No.3 connected to cathode, grid-No.2 voltage of 150 volts, grid-No.1 supply voltage of -3 volts, and grid-No.1 resistor of 0.25 megohm.

Note 7: With 90 volts dc between heater and cathode.

* DC component must not exceed 90 volts.



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AVERAGE PLATE CHARACTERISTICS
WITH E_{C2} AS VARIABLE

DEC. 8, 1953

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

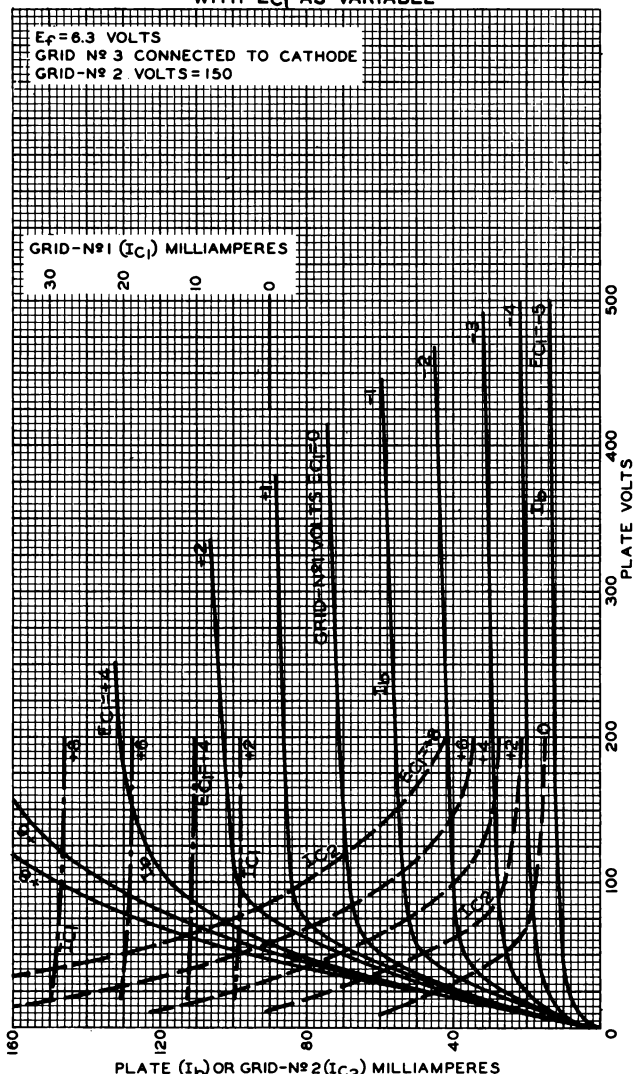
92CM-8150

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AVERAGE PLATE CHARACTERISTICS WITH E_{C1} AS VARIABLE



DEC. 4, 1953

TUBE DEPARTMENT

92CM - 8285

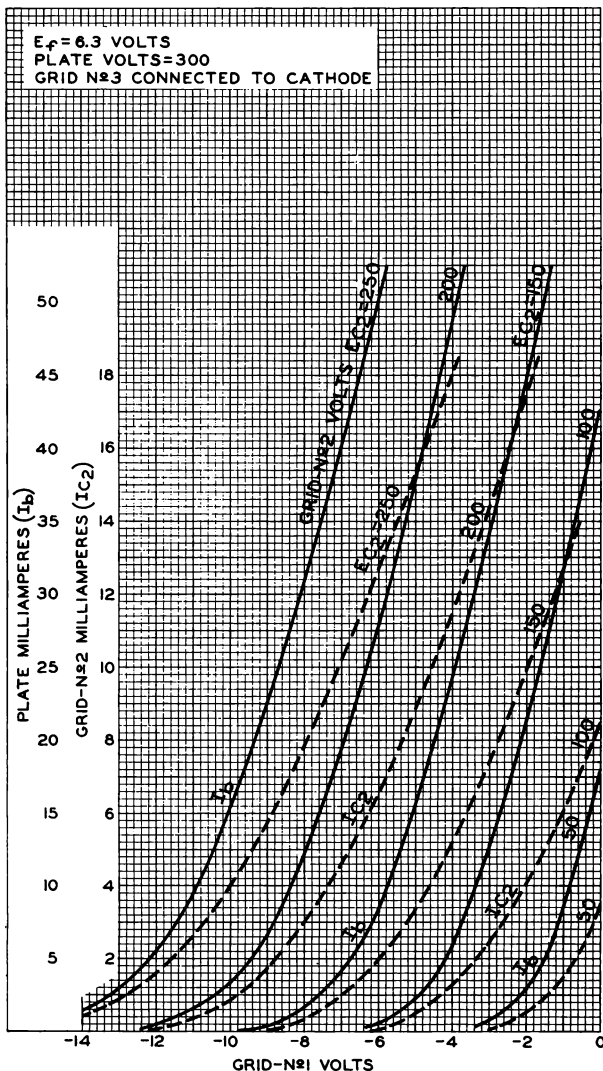
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AVERAGE CHARACTERISTICS



DEC.4,1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

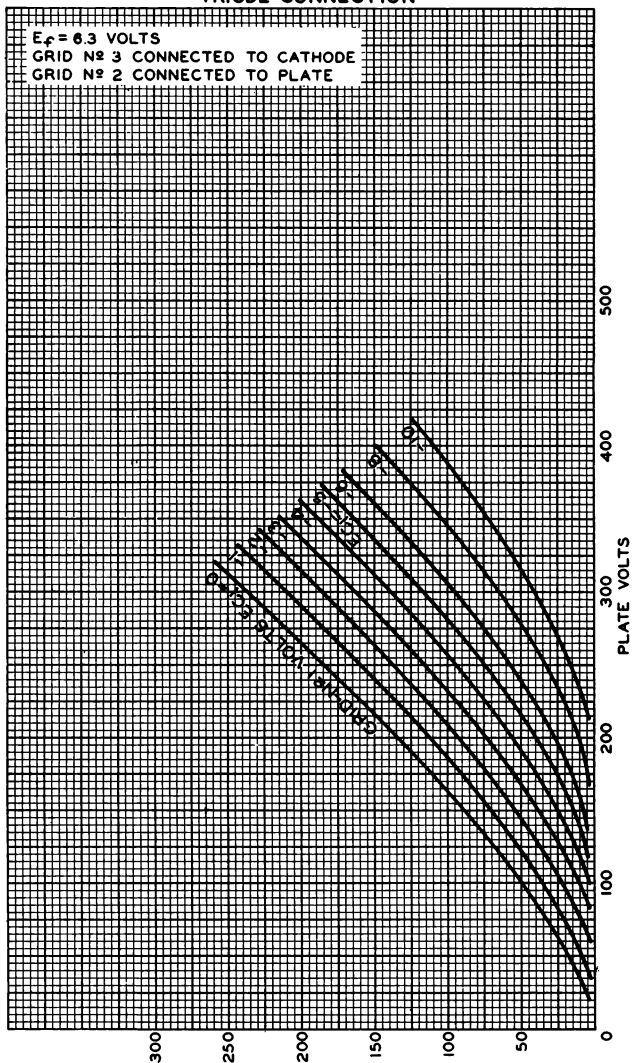
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AVERAGE PLATE CHARACTERISTICS TRIODE CONNECTION



DEC. 4, 1953

PLATE MILLIAMPERES
TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8286



6201

6201

HIGH-MU TWIN TRIODE

9-PIN MINIATURE TYPE

Intended for applications where dependable performance under shock and vibration is paramount, and for "on-off" control applications involving long periods of operation under cutoff conditions. The 6201, a "premium" version of the 12AT7, may be used at frequencies up to 300 Mc.

GENERAL DATA

Electrical:

Heater, Pure Tungsten, for Unipotential Cathodes:

	Series	Parallel	
Voltage.	12.6 $\pm$ 10%	6.3 $\pm$ 10%	ac or dc volts
Current.	0.15	0.3	amp

Direct Interelectrode Capacitances (Approx.):

Grid-Drive Operation:

	Without External Shield	With External Shield*	
Grid to plate (Each unit). . .	1.6	1.6	$\mu\mu\text{f}$
Grid to cathode and heater (Each unit)	2.5	2.5	$\mu\mu\text{f}$
Plate to cathode and heater (Unit No.1)	0.45	1.2	$\mu\mu\text{f}$
Plate to cathode and heater (Unit No.2)	0.38	1.3	$\mu\mu\text{f}$
Heater to cathode (Each unit).	2.8	2.8	$\mu\mu\text{f}$
Plate to plate	0.24	-	$\mu\mu\text{f}$

Cathode-Drive Operation:

	Without External Shield	With External Shield*	
Plate to cathode (Unit No.1).	0.2	0.18	$\mu\mu\text{f}$
Plate to cathode (Unit No.2).	0.24	0.2	$\mu\mu\text{f}$
Cathode to grid and heater (Each unit)	5	5	$\mu\mu\text{f}$
Plate to grid and heater (Unit No.1).	1.9	2.7	$\mu\mu\text{f}$
Plate to grid and heater (Unit No.2).	1.8	2.7	$\mu\mu\text{f}$

Characteristics, Class A₁ Amplifier (Each Unit):

Plate-Supply Voltage	100	250	volts
Cathode Resistor	270	200	ohms
Amplification Factor	57	60	
Plate Resistance (Approx.) . . .	14300	10900	ohms
Transconductance	4000	5500	μmhos
Plate Current.	3.3	10	ma
Grid Voltage (Approx.) for plate current of 10 μamp . . .	-5	-12	volts

*, .: See next page.



HIGH-MU TWIN TRIODE

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-3/16"
Maximum Seated Length	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip)	1-9/16" $\pm$ 3/32"
Maximum Diameter	7/8"
Dimensional Outline	See General Section
Bulb	T-6-1/2
Base	Small-Button Noval 9-Pin (JETEC No.E9-1)
Basing Designation for BOTTOM VIEW	9A

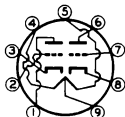
Pin 1 - Plate of
Unit No.2

Pin 2 - Grid of
Unit No.2

Pin 3 - Cathode of
Unit No.2

Pins 4 & 9 - Heater of
Unit No.2

Pins 5 & 9 - Heater of
Unit No.1



Pin 6 - Plate of
Unit No.1

Pin 7 - Grid of
Unit No.1

Pin 8 - Cathode of
Unit No.1

Pin 9 - Heater
Mid-Tap

AMPLIFIER - Class A₁

Values are for Each Unit

Maximum Ratings, Absolute Values:

PLATE VOLTAGE	330 max.	volts
GRID VOLTAGE:		
Negative bias value	55 max.	volts
Positive bias value	0 max.	volts
PLATE DISSIPATION	2.75 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	100 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface).	180 max.	°C

Maximum Circuit Values:

Grid-Circuit Resistance:	
For fixed-bias operation	0.25 max. megohm
For cathode-bias operation	1.0 max. megohm

Typical Operation as Resistance-Coupled Amplifier:

See RESISTANCE-COUPLED AMPLIFIER CHART
at end of tabulated data for this type

- * With external shield JETEC No.315 connected to cathode of unit under test.
- With external shield JETEC No.315 connected to grid of unit under test.



6201

6201

HIGH-MU TWIN TRIODE

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN*

*Values Are For Each Unit and are Initial,
Unless Otherwise Specified*

	Note	Min.	Max.	
Heater Current	1	0.138	0.162	amp
Direct Interelectrode Capacitances:				
Grid to plate	2	1.3	1.9	μf
Grid to cathode and heater	2	2	3	μf
Plate to cathode and heater (Unit No.1) . .	2	0.2	0.7	μf
Plate to cathode and heater (Unit No.2) . .	2	0.16	0.6	μf
Heater to cathode	2	2.1	3.5	μf
Plate to plate	3	0.15	0.33	μf
Amplification Factor . . .	1,4	50	70	
Plate Current (1)	1,4	7	14	ma
Plate-Current Difference				
Between Units	1,4	-	3.2	ma
Plate Current (2)	1,5	-	100	μamp
Transconductance (1) . .	1,4	4500	6500	μmhos
Transconductance (1) at 500 Hours	1,4	3800	6500	μmhos
Transconductance (2) . .	3,6	4100	-	μmhos
Transconductance Change:				
Difference between average transconductance (1) initially, and average after 500 hours, expressed as a percentage of the initial average	1,4	-	15	%
Reverse Grid Current . . .	1,7	-	0.7	μamp
Grid Emission Current . .	8,9	-	1.5	μamp
Heater-Cathode Leakage Current:				
Heater negative with respect to cathode . . .	1,10	-	10	μamp
Heater positive with respect to cathode . . .	1,10	-	10	μamp
Leakage Resistance:				
Between grid and all other electrodes tied together	1,11	100	-	megohms

- * Each tube is stabilized before characteristics testing by continuous operation for at least 45 hours at room temperature and with dissipation values equivalent to life test conditions.

Notes 1 to 11: See next page.



HIGH-MU TWIN TRIODE

	Note	Min.	Max.	
Leakage Resistance:				
Between plate and all other electrodes tied together.	1,12	100	-	megohms
Leakage Resistance at 500 Hours:				
Between grid and all other electrodes tied together.	1,11	50	-	megohms
Between plate and all other electrodes tied together.	1,12	50	-	megohms
Note 1: With 12.6 volts ac or dc on heater (series connection).				
Note 2: Without external shield and with unit not under test connected to ground.				
Note 3: Without external shield.				
Note 4: With dc plate-supply volts = 250, cathode resistor (ohms) = 200, and cathode bypass capacitor of 1000 μ f. Each unit tested separately. Unit not under test connected to ground.				
Note 5: With dc plate-supply volts = 250, plate load resistance (megohms) = 0.1, and dc grid volts = -20. Each unit tested separately. Unit not under test connected to ground.				
Note 6: With 11.0 volts ac or dc on heater (series connection).				
Note 7: With dc plate-supply volts = 250, grid-circuit resistance (megohms) = 0.5, cathode resistor (ohms) = 200, and cathode bypass capacitor of 1000 μ f. Each unit tested separately. Unit not under test connected to ground.				
Note 8: With 15.0 volts ac or dc on heater (series connection).				
Note 9: With dc plate volts = 250, grid-circuit resistance (megohms) = 0.5, and dc grid volts = -20. Each unit tested separately.				
Note 10: With 100 volts dc between heater and cathode and units connected in parallel.				
Note 11: With grid 100 volts negative with respect to all other electrodes tied together.				
Note 12: With plate 300 volts negative with respect to all other electrodes tied together.				

SPECIAL RATINGS & PERFORMANCE DATA

Shock Rating:

Impact Acceleration. 600 max. g

This test is performed on a sample lot of tubes from each production run in a Navy Type, High-Impact (flyweight) Shock Machine. Tubes are held rigid in four different positions and are subjected to 20 blows at the specified maximum impact acceleration. At the end of this test, tubes will not show permanent or temporary shorts or open circuits, and are required to meet established limits for vibrational acceleration, heater-cathode leakage current, and transconductance.

Fatigue Rating:

Vibrational Acceleration 2.5 max. g

This test is performed on a sample lot of tubes from each



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HIGH-MU TWIN TRIODE

production run. Tubes are rigidly mounted and subjected in each of three positions to 2.5 g vibrational acceleration at 25 cycles per second for 32 hours. At the end of this test, tubes will not show permanent or temporary shorts or open circuits, and are required to meet established limits for impact acceleration, heater-cathode leakage current, and transconductance.

Low-Frequency Vibration Performance:

RMS Output Voltage. 100 max. mv

This test is performed on a sample lot of tubes from each production run under the following conditions: plate of unit No.1 tied to plate of unit No.2, grid of unit No.1 tied to grid of unit No.2, heater volts = 12.6, dc plate volts = 250, dc grid volts = -3, plate load resistance (ohms) = 2000, and vibrational acceleration of 2.5 g at 25 cycles per second.

Heater-Cycling Life Performance:

Cycles of Intermittent Operation. 2000 min. cycles

Under the following conditions and with the heaters of unit No.1 and unit No.2 connected in parallel: heater volts = 7.5 cycled one minute on and one minute off, heater 135 volts positive with respect to cathode, and plate and grid volts = 0.

Audio-Frequency Noise and Microphonic Performance:

RMS Output Voltage. 100 max. mv

This test is performed on a sample lot of tubes from each production run under the following conditions: plate of unit No.1 tied to plate of unit No.2, grid of unit No.1 tied to grid of unit No.2, dc heater volts = 12.6, plate-supply volts = 300, cathode resistor (ohms) = 200 common to both units, and plate load resistance (ohms) = 10,000.

Shorts and Continuity Test:

This test is performed on a sample lot of tubes from each production run. In this test, a tube is considered inoperative if it shows a permanent or temporary short or open circuit, or a value of reverse grid current in excess of 1.4 microamperes under the conditions specified in the CHARACTERISTICS RANGE VALUES for reverse grid current.

1-Hour Stability Life Performance:

This test is performed on a sample lot of tubes from each production run to insure that the tubes have been properly stabilized. With both units operating, each unit is checked for variation in transconductance under conditions of maximum rated plate dissipation. At the end of 1 hour, the value of transconductance is read. The variation in transconductance from the 0-hour reading will not exceed 10 per cent.

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HIGH-MU TWIN TRIODE

100-Hour Life Performance:

This test is performed on a sample lot of tubes from each production run under the conditions of maximum rated plate dissipation to insure a low percentage of early inoperatives. At the end of 100 hours, a tube is considered inoperative if it shows a permanent or temporary short or open circuit, or a value of reverse grid current in excess of 1.4 microamperes under the conditions specified in CHARACTERISTICS RANGE VALUES for reverse grid current.

500-Hour Average Life Performance:

This 500-hour test is made on a sample lot of tubes from each production run to insure high quality of the individual tube and to guard against epidemic failures of any of the characteristics indicated below. With both units operating, each unit is life tested separately at room temperature under the following conditions: heater volts = 12.6 ac or dc (series connection), plate-supply volts = 250, cathode resistor (ohms) = 200, grid-circuit resistance (megohms) = 0.5, heater 135 volts positive with respect to cathode, and bulb temperature ($^{\circ}\text{C}$) = 180. At the end of 500 hours, tube will not show permanent shorts or open circuits and will be criticized for the total number of defects in the sample lot and for the number of tubes failing to pass the established initial limits for heater current, reverse grid current, heater-cathode leakage current, and 500-hour limits for transconductance (μ), transconductance change, and leakage resistance as shown under CHARACTERISTICS RANGE VALUES.



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HIGH-MU TWIN TRIODE**OPERATING CONSIDERATIONS AS RESISTANCE-COUPLED AMPLIFIER
(Each Unit)**

Plate-Supply Voltage	90			volts
Plate Load Resistor	0.1	0.24	0.51	megohm
Grid Resistor (Of following stage)	0.24	0.51	1	megohm
Cathode Resistor	2400	5300	11000	ohms
Peak Output Voltage	13	15	16	volts
Voltage Gain [▲]	27	28	28	

Plate-Supply Voltage	180			volts
Plate Load Resistor	0.1	0.24	0.51	megohm
Grid Resistor (Of following stage)	0.24	0.51	1	megohm
Cathode Resistor	1400	3600	7100	ohms
Peak Output Voltage	28	31	33	volts
Voltage Gain [▲]	33	33	32	

Plate-Supply Voltage	300			volts
Plate Load Resistor	0.1	0.24	0.51	megohm
Grid Resistor (Of following stage)	0.24	0.51	1	megohm
Cathode Resistor	1200	2900	6400	ohms
Peak Output Voltage	47	52	55	volts
Voltage Gain [▲]	33	34	34	

[▲] At 2 volts (rms) output.

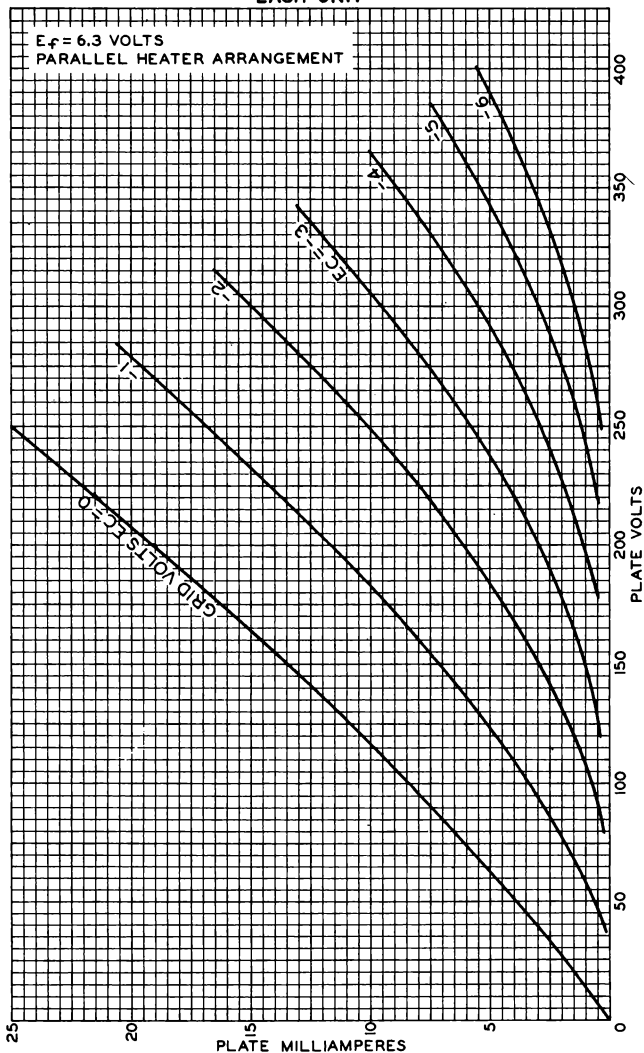
Note: Coupling capacitors should be selected to give desired frequency response. Cathode resistors should be adequately bypassed.

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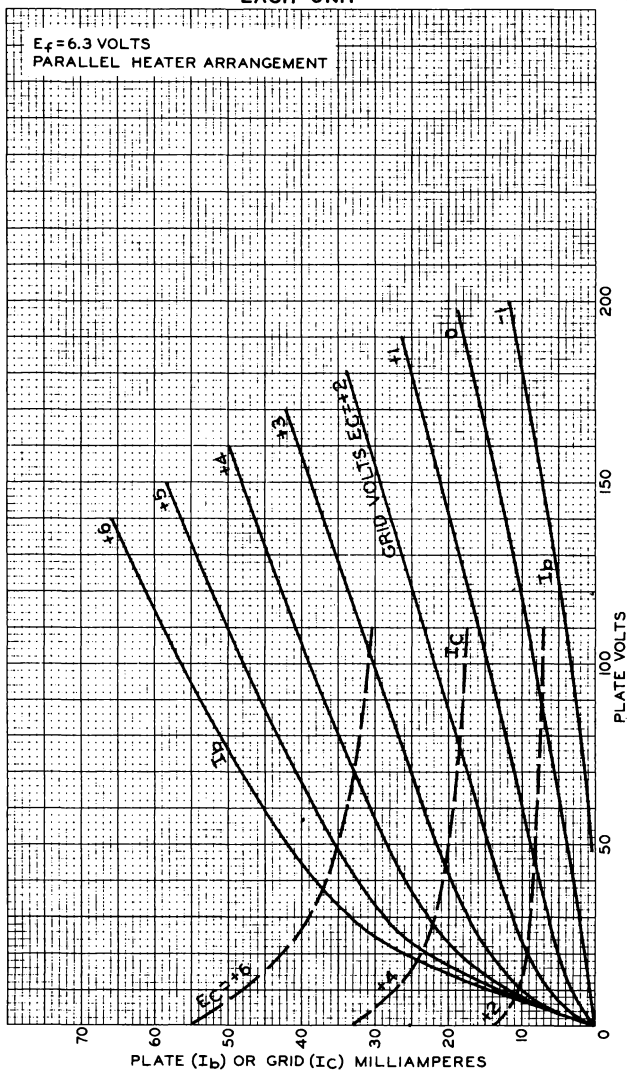
AVERAGE PLATE CHARACTERISTICS EACH UNIT





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AVERAGE CHARACTERISTICS
EACH UNIT

TUBE DIVISION

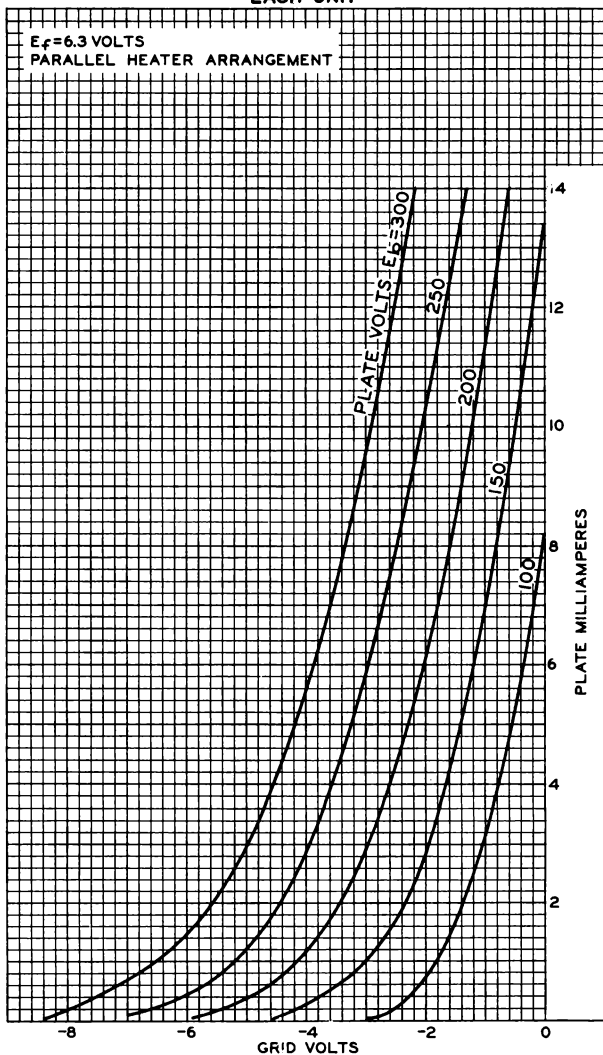
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92CM-9021

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AVERAGE CHARACTERISTICS
EACH UNIT

TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-9023



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MEDIUM-MU TWIN TRIODE

9-PIN MINIATURE TYPE

For "on-off" control applications involving
long periods of operation under cutoff conditions

GENERAL DATA**Electrical:**

Heater, Pure Tungsten, for Unipotential Cathodes:

Heater arrangement	Series	Parallel	
Voltage.	12.6 $\pm$ 5%	6.3 $\pm$ 5%	ac or dc volts
Current.	0.15	0.3	amp

Direct Interelectrode Capacitances:^o

	Unit No.1	Unit No.2	
Grid to plate.	2.22	2.22	μ f
Grid to cathode and heater .	2.90	2.90	μ f
Plate to cathode and heater .	0.54	0.46	μ f
Heater to cathode.	3.25	3.25	μ f
Plate of unit No.1 to plate of unit No.2	0.56		μ f
Grid of unit No.1 to grid of unit No.2.	0.06 max.		μ f

Characteristics, Class A₁ Amplifier (Each Unit):

Plate-Supply Voltage	100	volts
Cathode Resistor	470	ohms
Amplification Factor	27	
Plate Resistance (Approx.)	7500	ohms
Transconductance	3600	μ hos
Plate Current.	4.6	ma
Grid Voltage (Approx.) for plate voltage of 150 volts and plate current of 100 μ amp .	-8	volts

Mechanical:

Mounting Position.	Vertical, base up or down, or Horizontal with pins 1 and 5 in vertical plane
Maximum Overall Length	2-3/16"
Maximum Seated Length.	1-5/16"
Length, Base Seat to Bulb Top (Excluding tip) .	1-9/16" $\pm$ 3/32"
Maximum Diameter	7/8"
Dimensional Outline.	See General Section
Bulb	T-6-1/2
Base	Small-Button Noval 9-Pin (JETEC No.E9-1)
Basing Designation for BOTTOM VIEW	9A

Pin 1 - Plate of Unit No.2	Pin 6 - Plate of Unit No.1
Pin 2 - Grid Unit No.2	Pin 7 - Grid of Unit No.1
Pin 3 - Cathode of Unit No.2	Pin 8 - Cathode of Unit No.1
Pins 4 & 9 - Heater of Unit No.2	Pin 9 - Heater Mid-Tap
Pins 5 & 9 - Heater of Unit No.1	

^o Without external shield.

← Indicates a change.



MEDIUM-MU TWIN TRIODE

FREQUENCY DIVIDER IN COMPUTER SERVICE and "ON-OFF" CONTROL SERVICE

Values are for Each Unit

Maximum Ratings, Absolute Values:

PLATE VOLTAGE	200 max.	volts
GRID VOLTAGE:		
Negative bias value	100 max.	volts
Positive bias value	1 max.	volt
DC POSITIVE GRID CURRENT	2 max.	ma
DC CATHODE CURRENT	16 max.	ma
PLATE DISSIPATION	1 max.	watt
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode .	180 max.	volts
Heater positive with respect to cathode .	180 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface).	120 max.	°C

Maximum Circuit Values:

Grid-Circuit Resistance:

For fixed-bias operation.	0.1 max.	megohm
For cathode-bias operation.	0.5 max.	megohm

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	Min.	Max.	
Heater Current.	1	0.138	0.162	amp
Plate Current (Each unit) . .	1,2	4.8	5.5	ma
Plate Current (Each unit) . .	1,3	3.6	5.6	ma
Plate Current (Each unit) . .	1,2,4	-	100	μamp
Transconductance.	1,2,3	2700	4500	μmhos
Reverse Grid Current (Units in parallel).	1,5	-	1	μamp
Leakage Resistance (Each unit):				
Between grid and all other electrodes.	1,6	100	-	megohms
Between plate and all other electrodes.	1,7	100	-	megohms
Heater-Cathode				
Leakage Current:				
Heater negative with respect to cathode. . . .	1,8	-	20	μamp
Heater positive with respect to cathode. . . .	1,8	-	20	μamp
Difference in Grid Voltage				
Between Units	1,2,9	-	1	volt
Contact Potential	1,10	-	1	volt
Amplification Factor (Each unit).	1,2	23	31	

Note 1: With 12.6 volts ac or dc on heater (series arrangement).

▲ The dc component must not exceed 90 volts.

→ Indicates a change.



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MEDIUM-MU TWIN TRIODE

- Note 2: With plate-supply volts = 150, plate-circuit resistance (ohms) = 20,000, and grid-circuit resistance (ohms) = 47,000. Each unit tested separately. Unit not under test connected to ground.
- Note 3: With plate-supply volts = 100, cathode resistor (ohms) = 470, and cathode bypass capacitor of 1000 μ f. Each unit tested separately. Unit not under test connected to ground.
- Note 4: With grid volts = -10.
- Note 5: With plate-supply volts = 150, cathode resistor (ohms) = 470, and grid-circuit resistance (megohm) = 0.5.
- Note 6: With grid 100 volts negative with respect to all other electrodes tied together.
- Note 7: With plate 300 volts negative with respect to all other electrodes tied together.
- Note 8: With 100 volts dc between heater and cathode and units connected in parallel.
- Note 9: With grid voltage adjusted for plate current of 100 μ amp.
- Note 10: With plate volts = 100, grid current (μ amp) = 0.1, and grid-circuit resistance (megohm) = 0.1. Each unit tested separately. Unit not under test connected to ground.

SPECIAL RATINGS & PERFORMANCE DATA**Heater-Cycling Life Performance:**

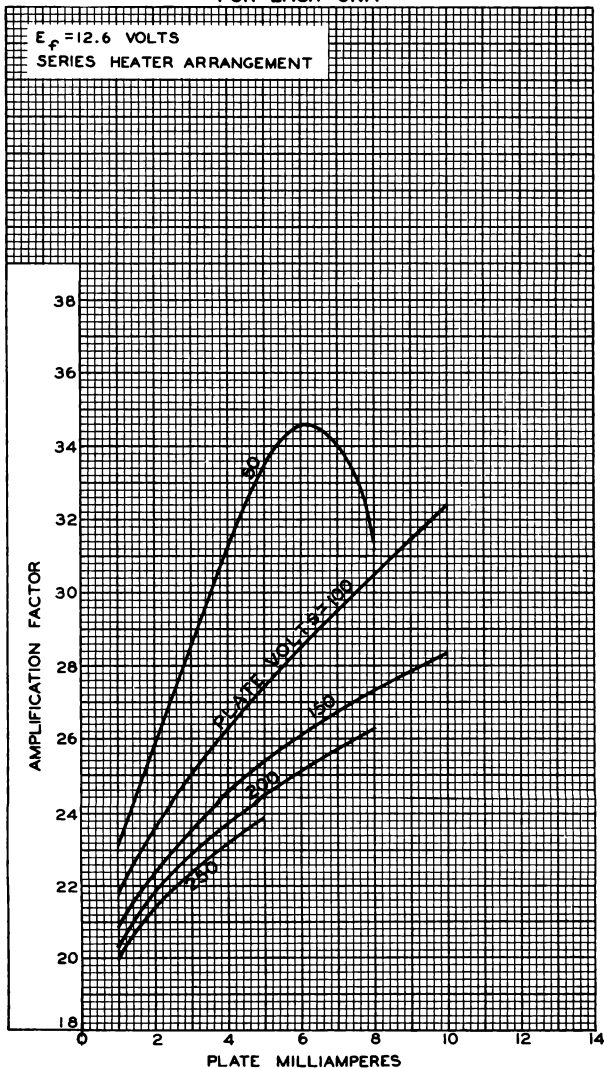
Cycles of Intermittent Operation. 2000 min. cycles
For conditions: Series heater arrangement, heater volts = 17, cycled 1 minute on and 4 minutes off, heater positive with respect to cathode by +100 volts dc, plate volts = 0, and grid volts = 0.

← Indicates a change.

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AVERAGE CHARACTERISTICS
FOR EACH UNIT

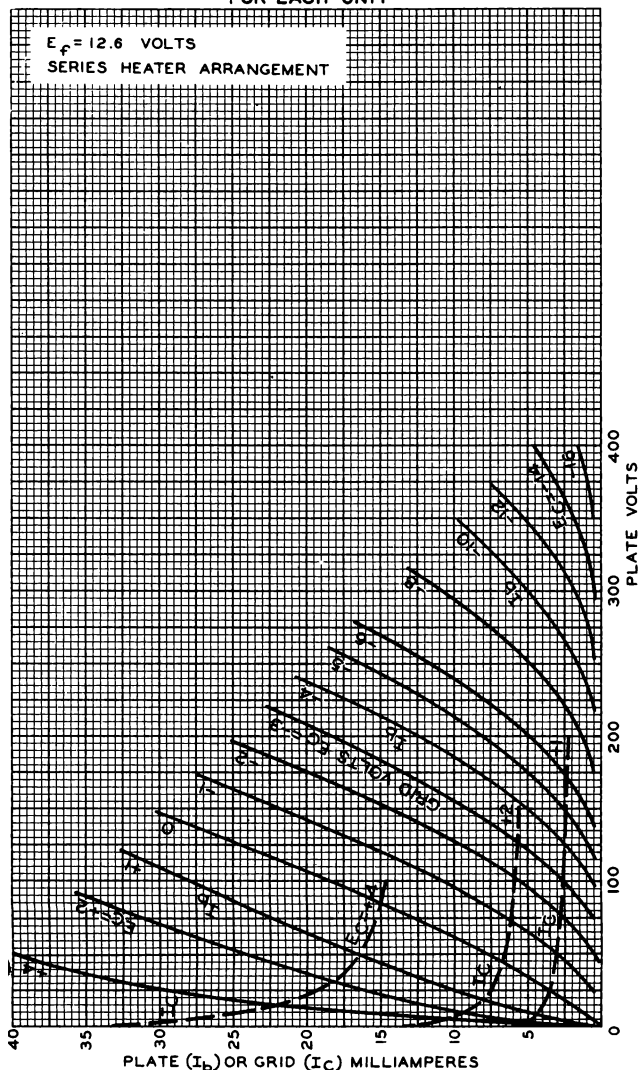


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AVERAGE PLATE CHARACTERISTICS
FOR EACH UNIT $E_f = 12.6$ VOLTS

SERIES HEATER ARRANGEMENT



JULY 9, 1952

TUBE DEPARTMENT

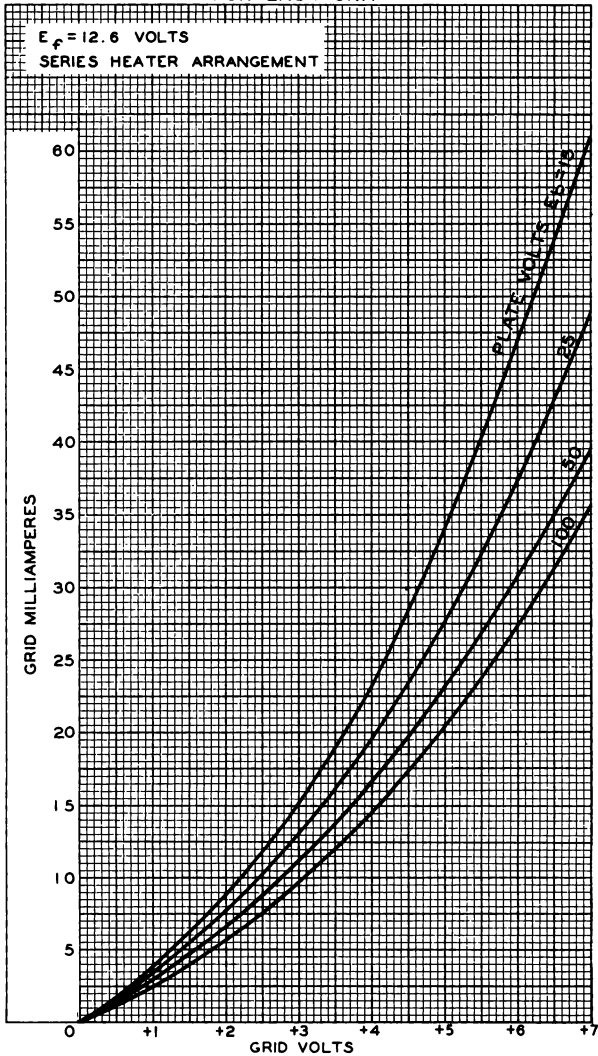
92CM-7622

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AVERAGE CHARACTERISTICS
FOR EACH UNIT

JAN. 6, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7823R1



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UHF MEDIUM-MU TRIODE

"PENCIL TYPE" WITH EXTERNAL PLATE RADIATOR

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathode:

Voltage (AC or DC):

Under Transmitting Conditions $6.0 \pm 10\%$ volts

Under Standby Conditions 6.3 max. volts

Current at 6.0 Volts 0.280 amp

Amplification Factor 27

Transconductance, for dc plate current of

27 milliamperes and dc plate voltage

of 200 volts 7000 μ hos

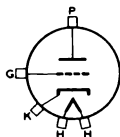
Direct Interelectrode Capacitances:

	With Exter- nal Shield [▲]	Without Exter- nal Shield	
-Grid to Plate	1.5	1.7	μ f
Grid to Cathode	—	2.9	μ f
Plate to Cathode	—	0.08 max.	μ f

Mechanical:

Terminal Connections:

H: Heater

K: Cathode Cylinder
(Adjacent to
heater lead
terminals)G: Grid Flange
(Between glass
sections)P: Plate Cylinder
(With integral
radiator)

Mounting Position Any

Dimensions and Terminal
Connections See Dimensional Outline

Radiator Integral part of tube

Cooling:

In many applications, the 6263 does not require forced-air cooling. The radiator in combination with a connector having adequate heat conduction capability will generally provide adequate cooling under conditions of free circulation of air. The cooling must be sufficient to limit the plate-seal temperature to 175°C. When conditions do not provide adequate circulation of air, provision should be made to direct a blast of cooling air from a small blower through the radiator fins. The quantity of air should be sufficient to limit the plate-seal temperature to 175°C. See curves.

Incoming Air Temperature 40 max. °C

Plate-Seal Temperature (Measured
on Plate Seal). 175 max. °C

Weight (Approx.). 24 grams (0.85 oz)

Socket for Heater Leads . . Cinch No.54A16325, or equivalent

[▲] A flat plate shield 1-1/4" diameter located parallel to the plane of the grid flange and midway between the grid flange and the radiator plate terminal. The shield is tied to the cathode.

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UHF MEDIUM-MU TRIODE

RF POWER AMPLIFIER & OSCILLATOR - Class C Telegraphy

Key-down conditions per tube without amplitude modulation*

CCS*

ICAS**

Maximum Ratings, Absolute Values:

For Pressures down to 46 mm of Hg**

DC PLATE VOLTAGE	330 max.	400 max.	volts
DC GRID VOLTAGE	-100 max.	-100 max.	volts
DC PLATE CURRENT	40 max.	55 max.	ma
DC GRID CURRENT	25 max.	25 max.	ma
DC CATHODE CURRENT	55 max.	70 max.	ma
PLATE INPUT	13 max.	22 max.	watts
PLATE DISSIPATION	8 max.	13 max.	watts

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode	90 max.	90 max.	volts
Heater positive with respect to cathode	90 max.	90 max.	volts

Typical Operation as Oscillator in Cathode-Drive

Circuit at 500 Mc:

DC Plate Voltage	300	350	volts
DC Grid Voltage [□]	-30	-35	volts
DC Plate Current	35	40	ma
DC Grid Current (Approx.)	11	14	ma
Useful Power Output (Approx.)	5 [•]	7 [•]	watts

Typical Operation as RF Power Amplifier in Cathode-Drive

Circuit at 500 Mc:

DC Plate Voltage	300	350	volts
DC Grid Voltage [□]	-48	-58	volts
DC Plate Current	35	40	ma
DC Grid Current (Approx.)	13	15	ma
Driver Power Output (Approx.)	2.2	3	watts
Useful Power Output (Approx.)	7 [•]	10 [•]	watts

Maximum Circuit Values (CCS or ICAS Conditions):

Grid-Circuit Resistance	0.1 max.	megohm
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PLATE-MODULATED RF POWER AMPLIFIER - Class C Telephony

Carrier conditions per tube for use with a max. modulation factor of 1.0

CCS*

ICAS**

Maximum Ratings, Absolute Values:

For Pressures down to 46 mm of Hg**

DC PLATE VOLTAGE	275 max.	300 max.	volts
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* Modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115 per cent of the carrier conditions.

#, ##, **, □, •: See next page.

MARCH 1, 1954

TUBE DEPARTMENT

TENTATIVE DATA 1

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



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UHF MEDIUM-MU TRIODE

DC GRID VOLTAGE	-100 max.	-100 max.	volts
DC PLATE CURRENT	33 max.	46 max.	ma
DC GRID CURRENT	25 max.	25 max.	ma
DC CATHODE CURRENT	50 max.	60 max.	ma
PLATE INPUT	9 max.	15 max.	watts
PLATE DISSIPATION	5.5 max.	9 max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	90 max.	90 max.	volts
Heater positive with respect to cathode	90 max.	90 max.	volts

Typical Operation in Cathode-Drive Circuit at 500 Mc:

DC Plate Voltage	275	320	volts
DC Grid Voltage ^a	-42	-52	volts
DC Plate Current	35	35	ma
DC Grid Current (Approx.)	13	12	ma
Driver Power Output (Approx.)	2	2.4	watts
Useful Power Output (Approx.)	6.7 ^b	8 ^b	watts

Maximum Circuit Values (CCS or ICAS Conditions):

Grid-Circuit Resistance	0.1 max.	megohm
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CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	Min.	Max.	
Heater Current	1	0.260	0.300	amp
Grid-to-Plate Capacitance	-	1.45	1.95	$\mu\mu\text{f}$
Grid-to-Cathode Capacitance	-	2.45	3.35	$\mu\mu\text{f}$
Plate-to-Cathode Capacitance	-	-	0.08	$\mu\mu\text{f}$
Plate Current	1,2	18	36	ma
Transconductance	1,2	5600	8400	μmhos
Useful Power Output	3,4	6.5	-	watts

Note 1: With 6.0 volts ac or dc on heater.

Note 2: With dc plate voltage of 200 volts, cathode resistor of $100 \pm 1\%$ ohms, and cathode bypass capacitor of 1000 μf .

Note 3: With 5.4 volts ac or dc on heater.

Note 4: With dc plate voltage of 350 volts, grid resistor adjusted to give a dc plate current of 50 milliamperes in a cavity-type oscillator operating at 500 megacycles per second and having an efficiency of about 75 per cent.

** Corresponds to altitude of about 60000 feet.

† Continuous Commercial Service.

†† Intermittent Commercial and Amateur Service.

□ From a grid resistor, or from a suitable combination of grid resistor and fixed supply or grid resistor and cathode resistor.

● This value of useful power is measured at load of output circuit having an efficiency of about 75 per cent.

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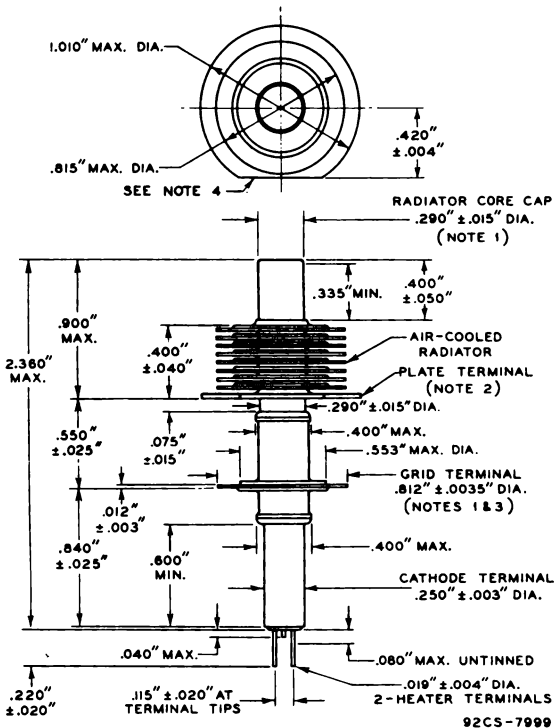


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UHF MEDIUM-MU TRIODE

OPERATING FREQUENCY

The 6263 can be operated as an rf power amplifier and oscillator with full ratings at frequencies up to 500 megacycles per second and with reduced ratings at frequencies as high as 1700 megacycles per second.



NOTE 1: MAX. ECCENTRICITY OF ϕ (AXIS) OF RADIATOR-CORE CAP OR GRID-TERMINAL FLANGE WITH RESPECT TO THE ϕ (AXIS) OF THE CATHODE TERMINAL IS 0.015".

MARCH 1, 1954

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RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-7999A



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UHF MEDIUM-MU TRIODE

NOTE 2: TILT OF PLATE-TERMINAL FIN OF RADIATOR WITH RESPECT TO ROTATIONAL AXIS OF CATHODE CYLINDER IS DETERMINED BY CHUCKING THE CATHODE TERMINAL, ROTATING THE TUBE, AND GAUGING THE TOTAL TRAVEL DISTANCE OF THE PLATE-TERMINAL FIN PARALLEL TO THE AXIS AT A POINT APPROXIMATELY 0.020" INWARD FROM THE STRAIGHT EDGE OF THE PLATE-TERMINAL FIN FOR ONE COMPLETE ROTATION. THE TOTAL TRAVEL DISTANCE WILL NOT EXCEED 0.035".

NOTE 3: TILT OF GRID-TERMINAL FLANGE WITH RESPECT TO ROTATIONAL AXIS OF CATHODE TERMINAL IS DETERMINED BY CHUCKING THE CATHODE TERMINAL, ROTATING THE TUBE, AND GAUGING THE TOTAL TRAVEL DISTANCE OF THE GRID-TERMINAL FLANGE PARALLEL TO THE AXIS AT A POINT APPROXIMATELY 0.020" INWARD FROM ITS EDGE FOR ONE COMPLETE ROTATION. THE TOTAL TRAVEL DISTANCE WILL NOT EXCEED 0.025".

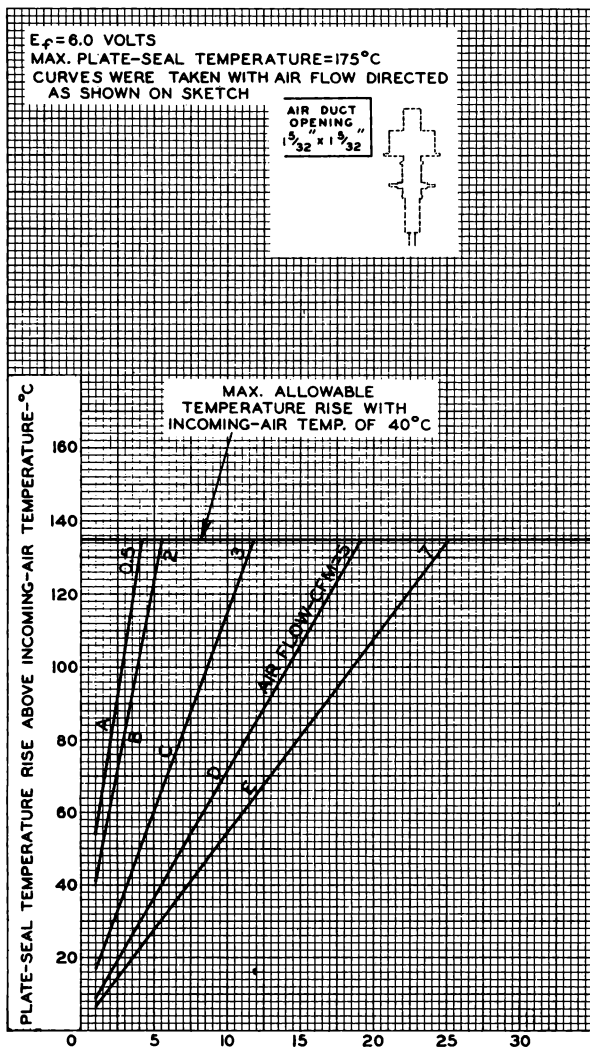
NOTE 4: THE STRAIGHT EDGE ON THE PERIMETER OF THE LARGE FIN (PLATE TERMINAL) IS PARALLEL TO A PLANE THROUGH THE CENTERS OF THE HEATER LEADS AT THEIR SEALS WITHIN 15°.

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COOLING REQUIREMENTS



OCT.13,1953

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 RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8120



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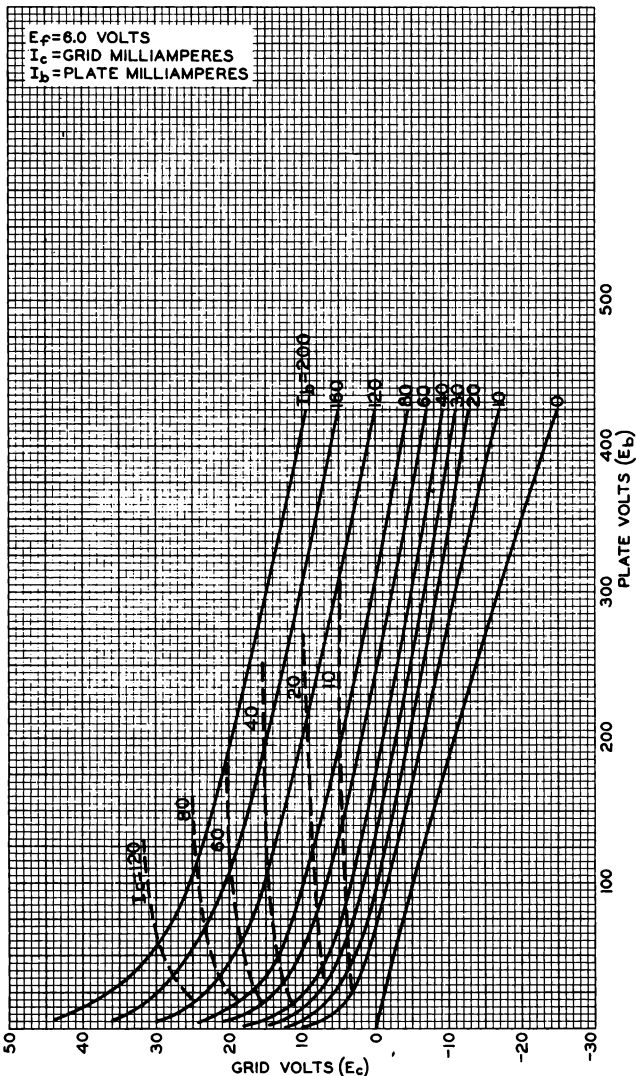
AVERAGE PLATE CHARACTERISTICS

6263



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AVERAGE CONSTANT-CURRENT CHARACTERISTICS



OCT. 7, 1953

 TUBE DEPARTMENT
 RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8104



6264

6264

UHF MEDIUM-MU TRIODE

"PENCIL TYPE" WITH EXTERNAL PLATE RADIATOR

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage (AC or DC):

Under Transmitting Conditions 6.0 $\pm$ 10% volts

Under Standby Conditions 6.3 max. volts

Current at 6.0 volts 0.280 amp

Amplification Factor 40

Transconductance, for dc plate current of 18.5 milliamperes and dc plate voltage of 200 volts 6800 μ mhos

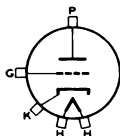
Direct Interelectrode Capacitances:

	With External Shield [▲]	Without External Shield
Grid to Plate	1.5	1.75 μ ft
Grid to Cathode	—	2.95 μ ft
Plate to Cathode	—	0.07 max. μ ft

Mechanical:

Terminal Connections:

H: Heater

K: Cathode Cylinder
(Adjacent to
heater-lead
terminals)G: Grid Flange
(Between glass
sections)P: Plate Cylinder
(With integral
radiator)

Mounting Position Any

Dimensions and Terminal

Connections See Dimensional Outline

Radiator Integral part of tube

Cooling:

In many applications, the 6264 does not require forced-air cooling. The radiator in combination with a connector having adequate heat conduction capability will generally provide adequate cooling under conditions of free circulation of air. The cooling must be sufficient to limit the plate-seal temperature to 175°C. When conditions do not provide adequate circulation of air, provision should be made to direct a blast of cooling air from a small blower through the radiator fins. The quantity of air should be sufficient to limit the plate-seal temperature to 175°C. See curves.

Incoming Air Temperature 40 max. °C

Plate-Seal Temperature (Measured on

Plate Seal) 175 max. °C

Weight (Approx.) 24 grams (0.85 oz)

Socket for Heater Leads . . Cinch No. 54A16325, or equivalent

[▲] A flat plate shield 1-1/4" diameter located parallel to the plane of the grid flange and midway between the grid flange and the radiator plate terminal. The shield is tied to the cathode.

6264



6264

UHF MEDIUM-MU TRIODE

RF POWER AMPLIFIER AND OSCILLATOR--Class C Telegraphy

*Key-down conditions per tube without amplitude modulation**

CCS*

ICAS**

Maximum Ratings, Absolute Values:

*For Pressures Down to 46 mm of Hg***

DC PLATE VOLTAGE	330 max.	400 max.	volts
DC GRID VOLTAGE	-100 max.	-100 max.	volts
DC PLATE CURRENT	40 max.	50 max.	ma
DC GRID CURRENT	25 max.	25 max.	ma
DC CATHODE CURRENT	55 max.	70 max.	ma
PLATE INPUT	13 max.	22 max.	watts
PLATE DISSIPATION	8 max.	13 max.	watts

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode	90 max.	90 max.	volts
Heater positive with respect to cathode	90 max.	90 max.	volts

Typical Operation as Oscillator in Cathode-Drive

Circuit at 500 Mc:

DC Plate Voltage	300	350	volts
DC Grid Voltage†	-25	-30	volts
DC Plate Current	35	35	ma
DC Grid Current (Approx.)	11	13	ma
Useful Power Output (Approx.) . .	5•	6•	watts

Typical Operation as RF Power Amplifier in

Cathode-Drive Circuit at 500 Mc:

DC Plate Voltage	300	350	volts
DC Grid Voltage†	-42	-45	volts
DC Plate Current	35	40	ma
DC Grid Current (Approx.)	13	15	ma
Driver Power Output (Approx.) . .	2.4	3	watts
Useful Power Output (Approx.) . .	7.5•	10•	watts

Maximum Circuit Values (CCS or ICAS Conditions):

Grid-Circuit Resistance	0.1 max.	megohm
-----------------------------------	----------	--------

FREQUENCY MULTIPLIER

CCS*

ICAS**

Maximum Ratings, Absolute Values:

*For Pressures Down to 46 mm of Hg***

DC PLATE VOLTAGE	300 max.	350 max.	volts
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* Modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115 per cent of the carrier conditions.

†, •, **, •: See next page.

MARCH 1, 1954

TUBE DEPARTMENT

TENTATIVE DATA 1

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



6264

6264

UHF MEDIUM-MU TRIODE

DC GRID VOLTAGE	-125 max.	-140 max.	volts
DC PLATE CURRENT	33 max.	45 max.	ma
DC GRID CURRENT	15 max.	15 max.	ma
DC CATHODE CURRENT	45 max.	55 max.	ma
PLATE INPUT	9.9 max.	15.8 max.	watts
PLATE DISSIPATION	6 max.	9.5 max.	watts

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode . . .	90 max.	90 max.	volts
Heater positive with respect to cathode . . .	90 max.	90 max.	volts

Typical Operation as Tripler to 510 Mc in

Cathode-Drive Circuit:

DC Plate Voltage	300	350	volts
DC Grid Voltage†	-110	-122	volts
DC Plate Current	26	36.5	ma
DC Grid Current (Approx.) . . .	4.1	5.8	ma
Driver Power Output (Approx.) .	2.75	4.5	watts
Useful Power Output (Approx.) .	2.1*	3.4*	watts

Maximum Circuit Values (CCS or ICAS Conditions):

Grid-Circuit Resistance	0.1 max.	megohm
-----------------------------------	----------	--------

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	Min.	Max.	
Heater Current	1	0.260	0.300	ma
Grid-to-Plate Capacitance . .	-	1.50	2.0	$\mu\mu\text{f}$
Grid-to-Cathode Capacitance .	-	2.50	3.40	$\mu\mu\text{f}$
Plate-to-Cathode Capacitance	-	-	0.07	$\mu\mu\text{f}$
Plate Current	1,2	13	24	ma
Transconductance	1,2	5400	8200	μmhos
Useful Power Output	3,4	6.5	-	watts

Note 1: With 6.0 volts ac or dc on heater.

Note 2: With dc plate voltage of 200 volts, cathode resistor of 100 ± 15 ohms, and cathode bypass capacitor of 1000 μf .

Note 3: With 5.4 volts ac or dc on heater.

Note 4: With plate voltage of 350 volts, grid resistor adjusted to give a dc plate current of 50 milliamperes in a cavity-type oscillator operating at 500 megacycles per second and having an efficiency of about 75 per cent.

* Corresponds to altitude of about 60000 feet.

† Continuous Commercial Service.

‡ Intermittent Commercial and Amateur Service.

• This value of useful power is measured at load of output circuit having an efficiency of about 75 per cent.

† From a grid resistor, or from a suitable combination of grid resistor and fixed supply or grid resistor and cathode resistor.

6264



6264

UHF MEDIUM-MU TRIODE

Outline Drawing and
Cooling-Requirement Curves for the 6264
are the same as shown for Type 6263

OPERATING FREQUENCY

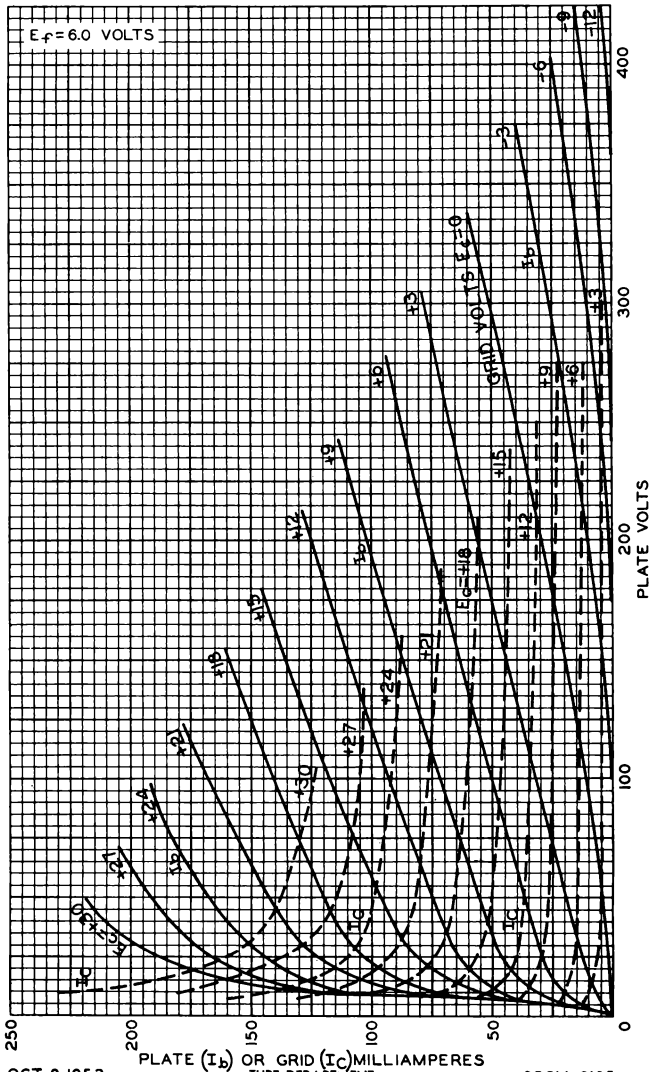
The 6264 can be operated as a frequency multiplier and as an rf power amplifier and oscillator with full ratings at frequencies up to 500 megacycles per second and with reduced ratings at frequencies as high as 1700 megacycles per second.



6264

6264

AVERAGE PLATE CHARACTERISTICS

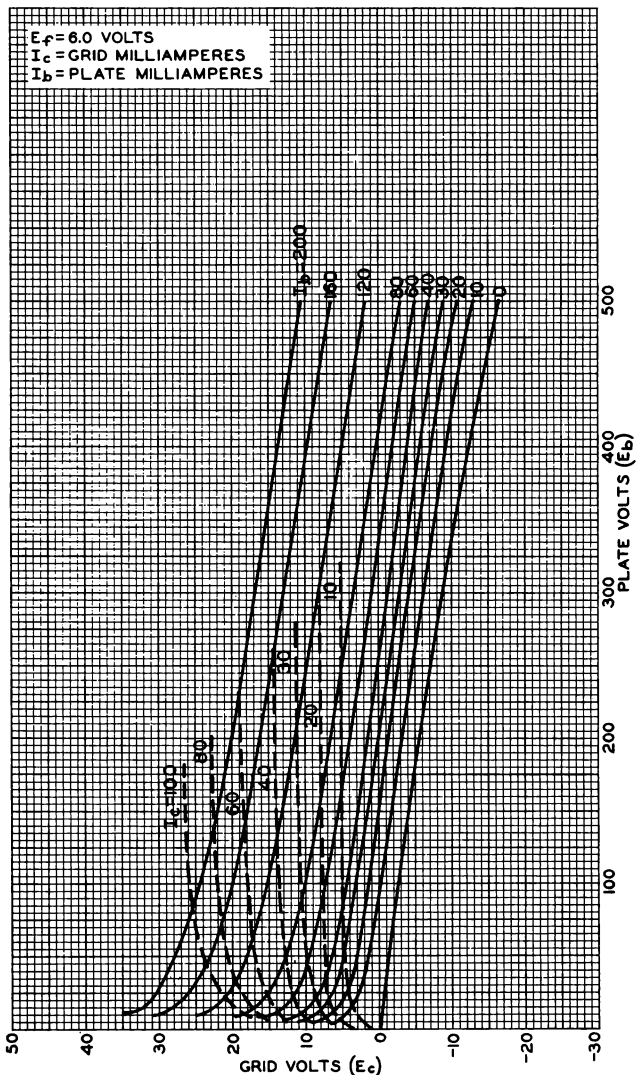


6264



6264

AVERAGE CONSTANT-CURRENT CHARACTERISTICS



OCT. 8, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8106



6521

MAGNETRON

FORCED-AIR COOLED

Fixed Frequency: 5400 $\pm$ 20 Mc

6521

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathode:

Voltage. 10 $\pm$ 10% ac or dc volts

Current. 3.2 amp

Starting current: The maximum instantaneous starting current must never exceed 12 amperes, even momentarily.

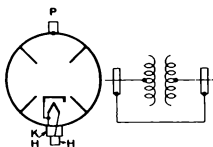
Minimum Cathode Heating Time 5 minutes

Frequency. 5400 $\pm$ 20 McMaximum Frequency Pulling
at VSWR of 1.5/1 10 McMaximum Frequency Change with
Anode Temperature Change
(After warmup) 0.15 Mc/ $^{\circ}$ C**Mechanical:**

Dimensions and

Terminal Connections:

See Dimensional Outline



H - Heater

K - Cathode

P - Anode

Connector (For heater terminal

and heater-cathode terminal) . . . Ucinite* No. 115364
with built-in capacitor, or equivalentMounting Position. Any
Air Flow:

To Fins--An air stream should be directed along the cooling fins toward the body of the tube. The stream may be obtained from a rectangular nozzle about 3" x 1-1/2" located so that the plane through the 3" side is parallel with the plane of a cooling fin and so that the nozzle is centered on the body of the tube. Adequate flow should be provided so that the temperature of the anode block does not exceed 150 $^{\circ}$ C.

To Heater-Cathode Terminal--Adequate flow should be provided to maintain the temperature of the heater-cathode terminal below 165 $^{\circ}$ C.

Weight (Approx.) 11-1/2 lbs

PULSED OSCILLATOR SERVICE**Maximum and Minimum Ratings, Absolute Values:**

For Duty Cycle of 0.001 max.

PEAK ANODE VOLTAGE 16 max. kv

PEAK ANODE CURRENT { 16 max. amp
10 min. amp

PEAK POWER INPUT* 256 max. kw

* Manufactured by Ucinite Division of United-Carr Fastener Corporation, Newtonville 60, Massachusetts.

• For atmospheric pressures greater than 40 centimeters of mercury at 25 $^{\circ}$ C, operation at pressures lower than 40 centimeters of mercury (altitudes higher than 16000 feet) may result in arcover with consequent damage to the tube.

MAY 1, 1955

TUBE DIVISION

TENTATIVE DATA 1

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



MAGNETRON

AVERAGE POWER INPUT.	0.256 max.	kw
PULSE DURATION.	2.2 max.	μsec
OPERATION TIME IN ANY 100-MICROSECOND INTERVAL.	5 max.	μsec
RATE OF RISE OF VOLTAGE PULSE.	{ 120 max. 80 min.	{ kv/μsec kv/μsec
ANODE BLOCK TEMPERATURE.	150 max.	°C
HEATER-CATHODE TERMINAL TEMPERATURE.	165 max.	°C
LOAD VOLTAGE STANDING-WAVE RATIO.	1.5 max.	

**Typical Operation[▲] with Load Voltage Standing-Wave
Ratio Equal To or Less Than 1.05**

With Duty Cycle of 0.0008

Heater Voltage.	<i>See Operating Considerations</i>	
Magnetic Field.	Supplied by permanent magnet integral with tube	
Peak Anode Voltage (Approx.).	15	kv
Peak Anode Current.	13.5	amp
Pulse Repetition Rate.	400	cps
Pulse Duration.	2	μsec
Maximum RF Bandwidth.	1.5	Mc
Peak Power Output.	85	kw

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	<i>Note</i>	<i>Min.</i>	<i>Max.</i>	
Heater Current.	1	2.8	3.6	amp
Peak Anode Voltage.	2	14	16	kv
Peak Power Output.	2,3	75	—	kw
Pulses Missing From Total.	2,4	—	0.25	%

Note 1: With 10.0 volts ac on heater.

Note 2: With peak anode current of 13.5 amperes, and heater voltage reduced to 9.1 volts.

Note 3: With peak anode voltage of approximately 15 kilovolts, anode block temperature of approximately 100°C, and maximum VSWR equal to or less than 1.05.

Note 4: Pulses are considered to be missing if the energy level at the operating frequency is less than 70 per cent of the normal value at a VSWR of 1.5, and with VSWR phase adjusted to produce maximum instability.

OPERATING CONSIDERATIONS

The *waveguide output flange* is designed for use with a standard 1" x 2" rectangular waveguide such as that designated by RETMA as WR 187, or that having the JAN designation RG-49/U, and mates with flanges such as Airtron[■] No. B54626 or equivalent.

▲ It is essential that the input circuit be designed so that if arcing occurs the energy per pulse delivered to the tube cannot greatly exceed the normal energy per pulse. To satisfy this requirement, it is recommended that pulsers of the discharging-network type be used.

■ Manufactured by Airtron, Inc., Linden, N. J.



6521

6521

MAGNETRON

As soon as the 6521 begins to oscillate, the *heater voltage* should be reduced to 9.1 volts when it is operated under the typical operating conditions shown in the tabulated data. For other operating conditions, the heater voltage (E_f) should be reduced depending on the average power input (P_i) to the tube as follows:

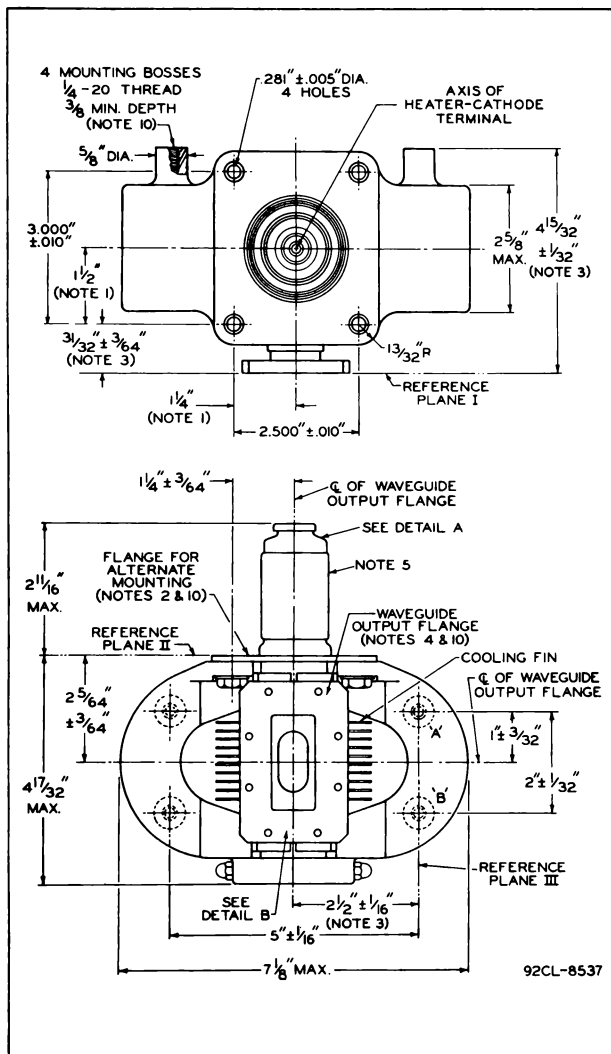
P_i (watts)	E_f (volts)
up to 90	10.0
90 to 130	9.9
130 to 180	9.5
180 to 220	9.1
220 to 256	8.9

6521



6521

MAGNETRON



MAY 1, 1955

TUBE DIVISION

CE-8537A

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

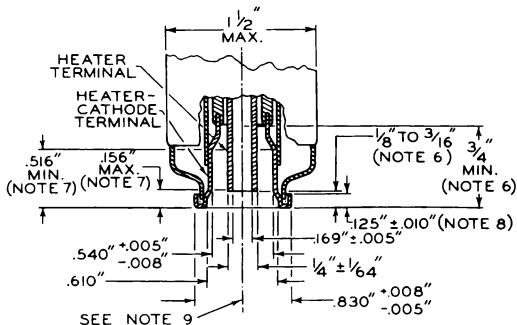


6521

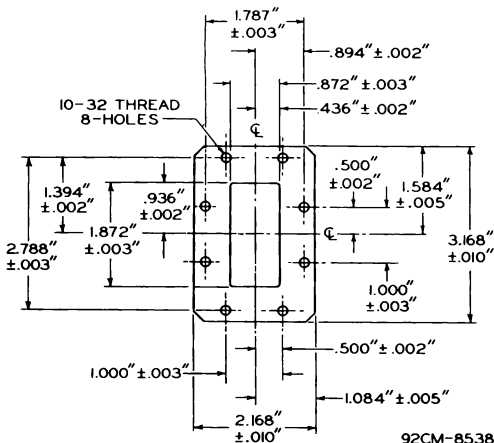
6521

MAGNETRON

DETAIL A



DETAIL B



92CM-8538

Reference plane I is defined as that plane against which the waveguide output flange abuts.

Reference plane II is defined as that plane perpendicular to reference plane I and touching the surface of the flange for alternate mounting.

Reference plane III is defined as that plane perpendicular to reference plane I and passing through the exact centers of holes 'A' and 'B'.

**MAGNETRON**

NOTE 1: The axis of the heater-cathode terminal will be within the confines of a cylinder whose radius is $3/64$ " and whose axis is perpendicular to reference plane *II* at the specified location.

NOTE 2: When resting on a smooth surface, this flange surface shall have a flatness such that a 0.050" thickness gauge $1/8$ " wide shall not enter between the two surfaces, and it shall be perpendicular to reference plane *I* within $\pm 2^\circ$.

NOTE 3: The tolerances include angular as well as lateral deviations.

NOTE 4: With the waveguide output flange resting on a plane surface, a 0.005" thickness gauge $1/8$ " wide shall not enter between the two surfaces.

NOTE 5: No part of the tube support fastened to the flange for alternate mounting should extend within the surface of a cylinder whose radius is $3/4$ " and whose axis is perpendicular to reference plane *II* at the specified location.

NOTE 6: These dimensions define extremities of the 0.169" internal diameter of the cylindrical heater terminal.

NOTE 7: These dimensions define extremities of the 0.540" internal diameter of the cylindrical heater-cathode terminal.

NOTE 8: No part of the connector device for the heater and heater-cathode terminals should bear against the underside of this lip.

NOTE 9: The heater terminal and heater-cathode terminal are concentric within 0.010".

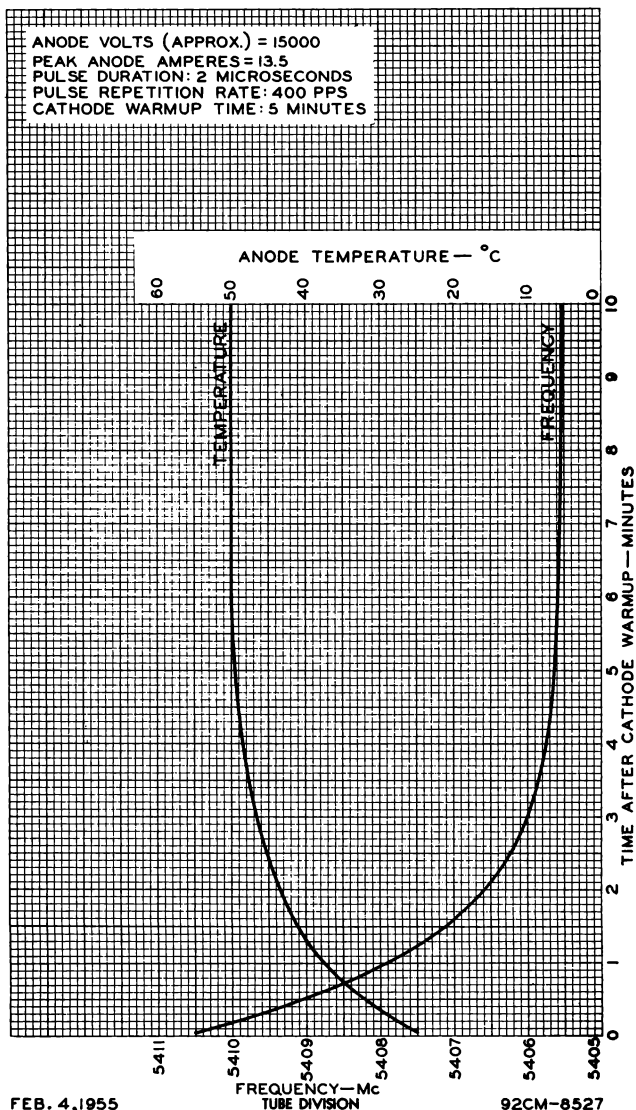
NOTE 10: Connection to the anode may be made through the mounting bosses, the flange for alternate mounting, or the waveguide output flange.



6521

6521

TYPICAL STABILIZATION CHARACTERISTICS



FEB. 4, 1955

92CM-8527

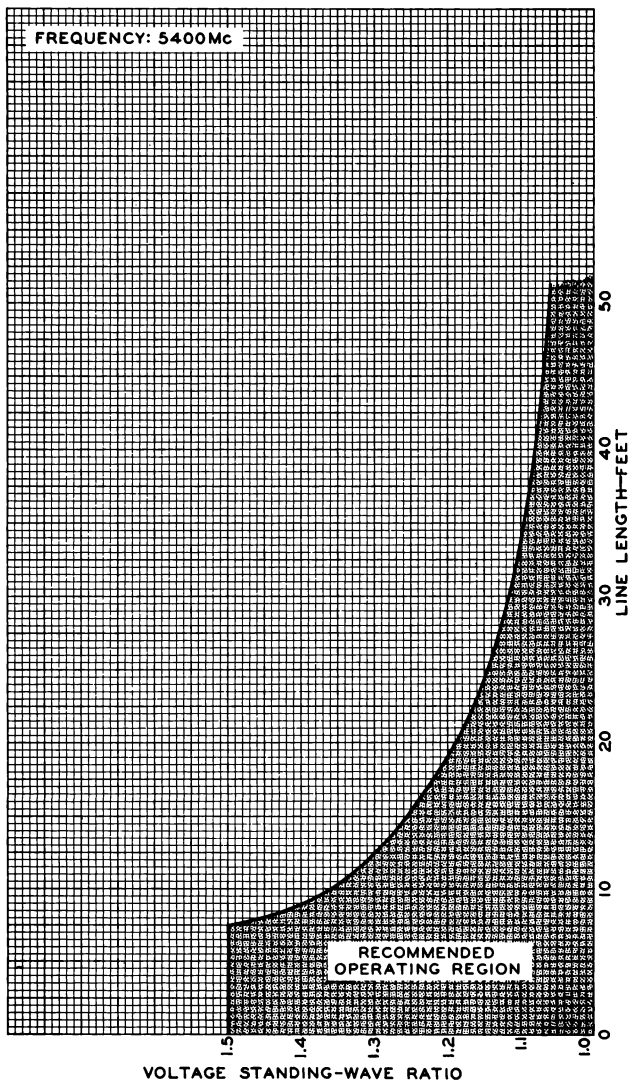
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

6521



6521

OPERATING REGION



FEB. 4, 1955

TUBE DIVISION

92CM-8528

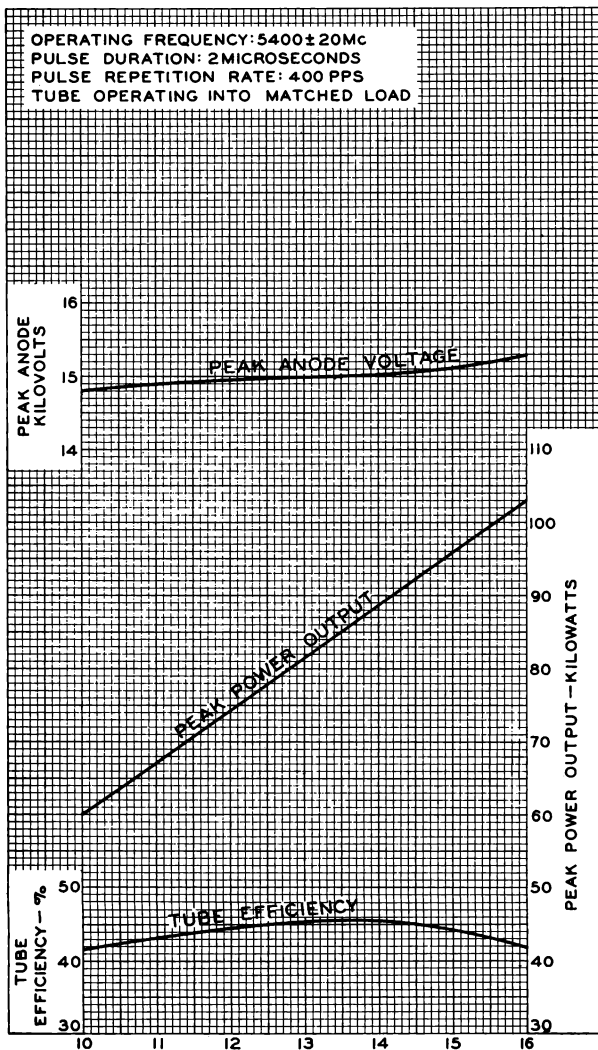
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



6521

6521

PERFORMANCE CHART



FEB. 8, 1955

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6533



6562

6562

FIXED-TUNED OSCILLATOR TRIODE

"PENCIL TYPE" WITH INTEGRAL RESONATORS

For radiosonde service at 1680 Mc

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathode:

Voltage range* 5.2 to 6.6 ac or dc volts

Current at 6.0 volts. 0.160 amp

Frequency (Approx.) 1680 Mc

Frequency Adjustment

Range $\pm 12^\Delta$ Mc

RF Coaxial Output Terminal:

Characteristic impedance

(Approx.) 50 ohms

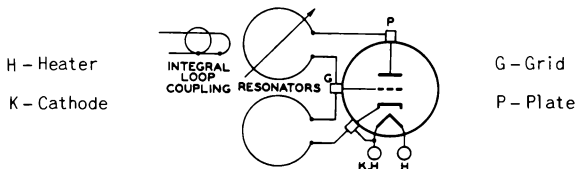
Mechanical:

Mounting Position Any

Dimensions. See Dimensional Outline

Resonators (Two). Integral Part of Tube

Terminal Connections (See Dimensional Outline):

**FIXED-TUNED OSCILLATOR SERVICE****Maximum Ratings, Absolute Values:**

DC PLATE VOLTAGE. 120 max. volts

DC PLATE CURRENT. 34 max. ma

DC GRID CURRENT 8 max. ma

PLATE INPUT 4 max. watts

PLATE DISSIPATION 3.6 max. watts

PEAK HEATER-CATHODE VOLTAGE 0 max. volts

AMBIENT-TEMPERATURE RANGE -55 to +75 °C

Operating Frequency Drift:

Maximum Frequency Drift:

For heater voltage range of 5.2 to 6.6 volts,
 plate voltage range of 95 to 117 volts, and
 ambient-temperature range of +22° to -40°C +4 to -1 Mc

* This range of heater voltage is for radiosonde applications in which the heater is supplied from batteries and in which the equipment design requirements of minimum size, light weight, and high efficiency are the primary considerations even though the average life expectancy of the 6562 in such service is only a few hours.

Δ As supplied, tubes are adjusted to 1680 $\pm$ 4 megacycles.



FIXED-TUNED OSCILLATOR TRIODE

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	Min.	Av.	Max.	
Heater Current.	1	0.135	0.148	0.157	amp
Power Output.	2,4	—	600	—	mw
Power Output.	3,4	300	—	—	mw

Note 1: With 5.2 volts ac on heater.

Note 2: With ac heater voltage of 6.6 volts, dc plate voltage of 117 volts, frequency of 1680 megacycles per second and grid resistor chosen within the range of 1300 to 1800 ohms. The choice of grid resistor should be such that for any individual tube, the dc plate current must not exceed 34 milliamperes, and when this value of grid resistor is used in the test of Note 3, a minimum power output of 300 milliwatts is obtained.

Note 3: With ac heater voltage of 5.2 volts, dc plate voltage of 95 volts, frequency of 1680 megacycles per second, and grid resistor chosen within the range of 1300 to 1800 ohms. The choice of grid resistor to give a minimum power output of 300 milliwatts for any individual tube must be such that when this same resistor value is used in the test of Note 2 the dc plate current will not exceed 34 milliamperes.

Note 4: Measured with a coaxial-type load having an impedance of approximately 50 ohms and adjusted for a maximum voltage standing-wave ratio of 1.1.

OPERATING CONSIDERATIONS

The *flexible heater leads* of the 6562 are usually soldered to the circuit elements. Soldering of these connections should not be made closer than 3/4" from the end of the tube (excluding cathode tab). If this precaution is not followed, the heat of the soldering operation may crack the glass seals of the leads and damage the tube. Under no circumstances should any of the electrodes be soldered to the circuit elements. Connections to the electrodes should be made by spring contact only.

The 6562 should be supported by a suitable clamp around the metal shell either above or below the frequency-adjustment screw. It is essential, however, that the pressure exerted on the shell by the clamp be held to a minimum because excessive pressure can distort the resonators and result in a change of frequency.

The *plate connection* should have a flexible lead which will accommodate variations in the relative position of the plate terminal in individual tubes.

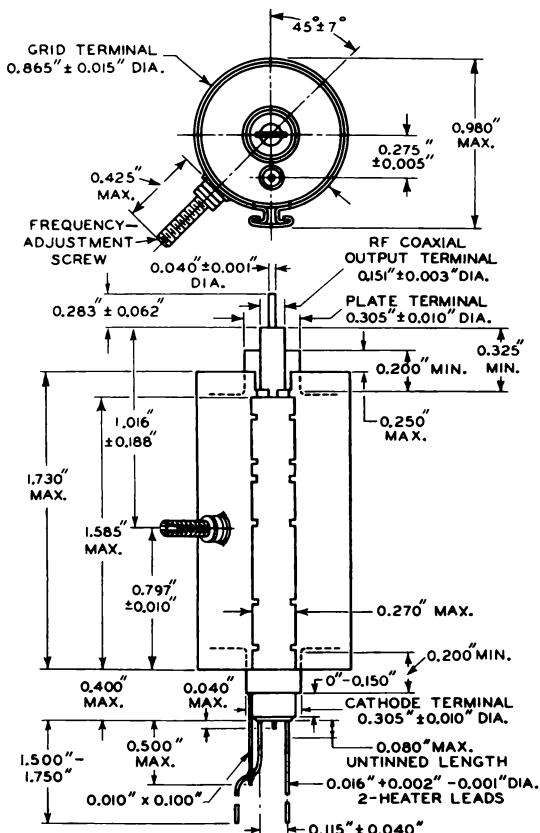
The 6562 may be mechanically tuned by adjustment of the frequency-adjustment screw located on the metal shell of the tube. A clockwise rotation of the frequency-adjustment screw will decrease the frequency, while a counter-clockwise rotation will increase the frequency. The range of adjustment provided by the screw is ± 12 megacycles.



6562

6562

FIXED-TUNED OSCILLATOR TRIODE



92CM-8747



6861

6861

TRAVELING-WAVE TUBE

LOW-NOISE AMPLIFIER TYPE

Useful over frequency range of 2700 to 3500 Mc

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage 5 ac or dc volts

Current at 5 volts. 0.65 amp

Starting current: The maximum instantaneous starting current must never exceed 4 amperes, even momentarily.

Minimum Cathode Heating Time 1 minute

Frequency Range 2700 to 3500 Mc

Cold Insertion Loss 80 db

Mechanical:

Mounting Position Any

Maximum Overall Length. 19-3/8"

Metal-Shell Diameter. 1.375" $\pm$ 0.005"

Weight (Approx.). 1-1/2 lbs

Collector-Terminal Connector. . . Birnbach No.406 Banana Jack

RF Connectors:

Input terminal. Type N UG-18/U Plug

Output terminal Type N UG-18/U Plug

Base. Octal 8-Pin

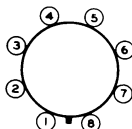
BOTTOM VIEW

Pin 1 - Grid No.1

Pin 2 - No Connection

Pin 3 - Helix

Pin 4 - Grid No.4



Pin 5 - Grid No.3

Pin 6 - Grid No.2

Pin 7 - Heater

Pin 8 - Heater, Cathode

Maximum and Minimum Ratings, Absolute Values:

DC COLLECTOR VOLTAGE. 500 max. volts

DC HELIX VOLTAGE. 500 max. volts

DC GRID-No.4 VOLTAGE. 500 max. volts

DC GRID-No.3 VOLTAGE. 300 max. volts

DC GRID-No.2 VOLTAGE. 75 max. volts

DC GRID-No.1 VOLTAGE. 20 max. volts

DC COLLECTOR CURRENT. 1000 max. μ ampDC HELIX CURRENT. 10 max. μ amp

MAGNETIC FIELD STRENGTH 400 min. gauss

PEAK RF POWER INPUT 250 max. watts

AVERAGE RF POWER INPUT. 1 max. watt

METAL-SHELL TEMPERATURE

(At hottest point). 175 max. $^{\circ}$ C

▲ During alignment of the tube in the magnetic-focusing field, the helix current may exceed this value for short periods, but should never exceed 50 μ amp.

● This value of field strength will focus the electron beam, but noise figure will not be optimum.



TRAVELING-WAVE TUBE

Typical Operation at 3100 Mc:

DC Collector Voltage	400	volts
DC Helix Voltage	375	volts
DC Grid-No.4 Voltage	200	volts
DC Grid-No.3 Voltage	40	volts
DC Grid-No.2 Voltage (Approx.)	20	volts
DC Grid-No.1 Voltage	0	volts
DC Collector Current	150	μ amp
DC Helix Current	0.5	μ amp
DC Grid-No.4 Current	each less than 1 μ amp	
DC Grid-No.3 Current		
DC Grid-No.2 Current		
DC Grid-No.1 Current		
Magnetic Field Strength†	525 $\pm$ 5%	gausses
Gain (Low level)	25	db
Power Output (Saturated)	1.0	mw
Noise Figure	6.5	db

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	Min.	Max.	
Heater Current	1	0.45	0.85	amp
Input VSWR (Non-operating)	2	—	1.7	
Output VSWR (Non-operating)	2	—	2.0	
DC Helix Voltage	3	350	390	volts
DC Grid-No.4 Voltage	3	160	250	volts
DC Grid-No.3 Voltage	3	30	50	volts
Saturated Power Output	3	0.25	—	mw
Gain	3	20	—	db
Noise Figure	3	—	7.0	db

Note 1: With heater voltage of 5.0 volts.

Note 2: Measured at specified connector over the frequency range of 2700 to 3500 Mc.

Note 3: Adjusted for optimum noise figure with a magnetic field of 525 gauss, signal frequency of 3100 Mc, and heater voltage of 5 volts.

OPERATING CONSIDERATIONS

The *magnetic field* required for focusing the electron beam of the 6861 may be obtained from a solenoid or permanent magnet capable of providing a uniform field of 525 gauss over the length of the tube axis starting 2 inches from the groove near the base end of the metal shell and continuing for at least 9 inches along the tube axis.

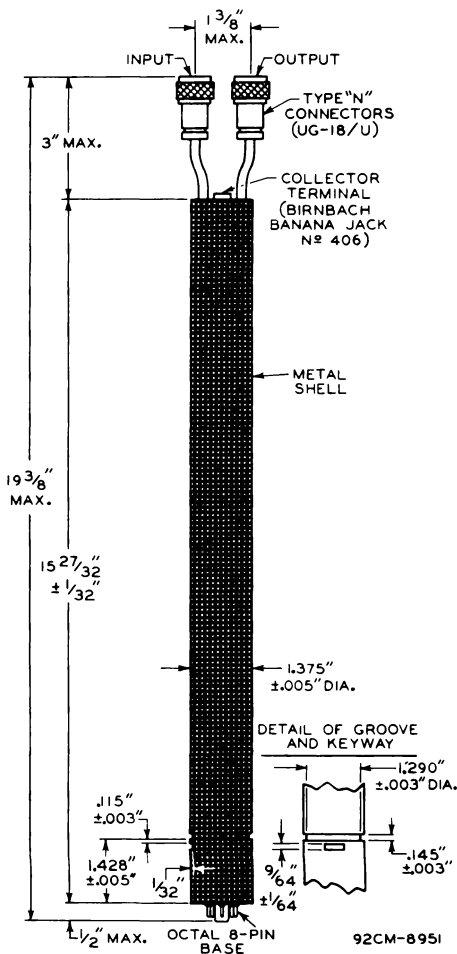
† For RCA Solenoid, Developmental No. J-2006.



6861

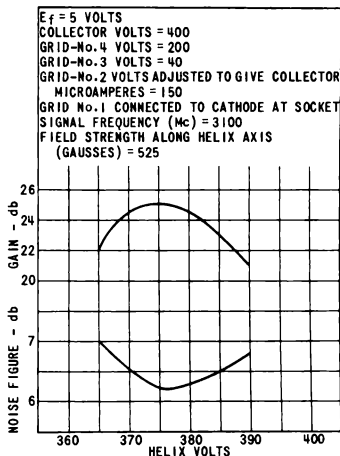
6861

TRAVELING-WAVE TUBE

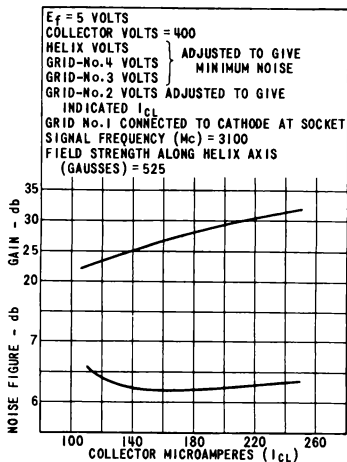




NOISE-FIGURE CHARACTERISTICS



92CS-8965T



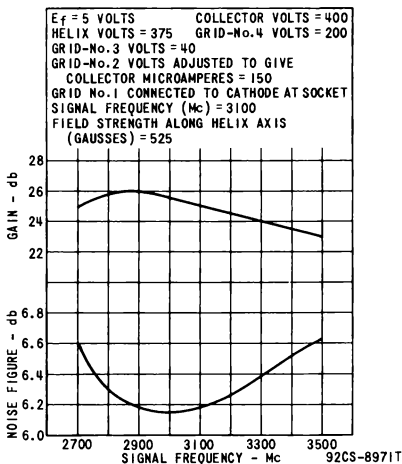
92CS-8968T



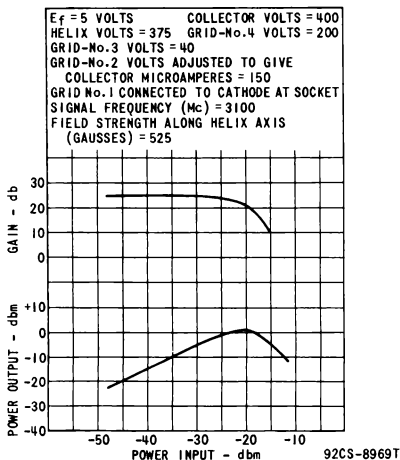
6861

6861

TRAVELING-WAVE TUBE

NOISE - FIGURE
CHARACTERISTICS

SATURATION CHARACTERISTICS

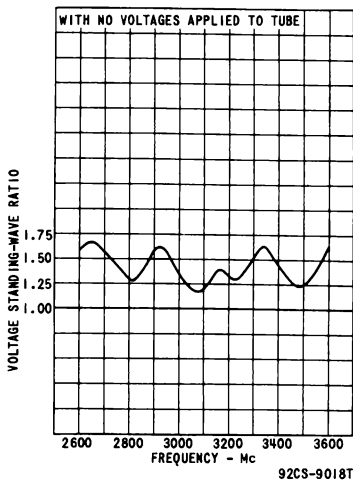


6861



6861

INPUT-MATCHING CHARACTERISTIC





8013-A

8013-A

HALF-WAVE VACUUM RECTIFIER

GENERAL DATA

Electrical:

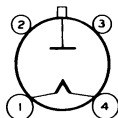
Filament, Thoriated Tungsten:

	Min.	Av.	Max.	
Voltage	2.37	2.50	2.63	ac volts
Current at 2.50 volts	4.7	5.0	5.3	amp

Mechanical:

Mounting Position . . Any, preferably vertical with base down
 Maximum Overall Length 6-1/16"
 Seated Length 5-9/32" $\pm$ 5/32"
 Maximum Diameter 2-1/16"
 Weight (Approx.) 2.9 oz
 Bulb ST-16
 Cap Skirted Medium with Rolled Edge (JETEC No. C1-19)
 Base Medium-Shell Small 4-Pin (JETEC No. A4-9)
 Basing Designation for BOTTOM VIEW 4P

Pin 1 - Filament
 Pin 2 - No Connection
 Pin 3 - No Connection



Pin 4 - Filament
 Cap - Plate

HALF-WAVE RECTIFIER

Maximum Ratings, Absolute Values:

PEAK PLATE VOLTAGE:

Forward	40000 [▲] max.	volts
Inverse	40000 [▲] max.	volts

PLATE CURRENT:

Peak	150 max.	ma
Average	20 max.	ma
Fault	500 max.	ma

PLATE DISSIPATION 12 max. watts

OPERATING CONSIDERATIONS

Filament and plate voltage may be applied simultaneously to the 8013-A.

The *bulb* of the 8013-A should be cleaned regularly. Accumulation of dust or other foreign matter on the bulb will cause leakage and, as a result, probably tube failure.

X-rays are produced during normal operation of the 8013-A. These rays can constitute a health hazard unless the tube is adequately shielded for X-ray radiation. Although relatively simple shielding should prove adequate, make sure it provides the required protection to the operator.

[▲]This value may be increased to 55000 volts when the 8013-A is immersed in oil.

← Indicates a change.

SEPT. 1, 1955

TUBE DIVISION

DATA

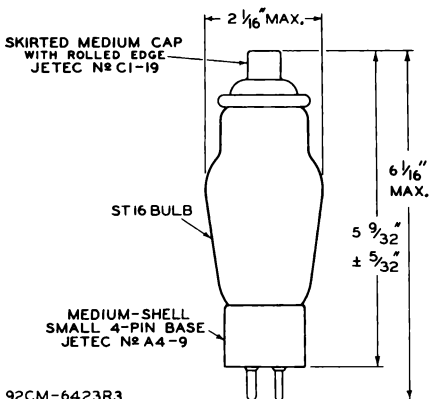
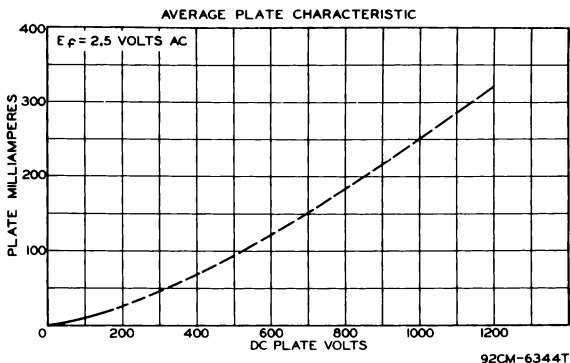
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

8013-A



8013-A

HALF-WAVE VACUUM RECTIFIER



SEPT. 1, 1955

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-6344T
-6423R3



8020

8020

HALF-WAVE HIGH-VACUUM RECTIFIERDATA**Electrical:****Filament, Thoriated Tungsten:**

Voltage.	5	volts
Current.	5.5-6.5	amp
Direct Interelectrode Capacitance:		
Anode to Filament. . .	1.4	μμf
Tube Voltage Drop		
at 100 ma.	200	volts

Mechanical:

Mounting Position.	Vertical, Base Down
Overall Length	7-1/2" ± 1/2"
Maximum Diameter	2-5/16"
Bulb	T-18
Cap.	Medium
Base	Medium 4-Pin, Bayonet

RECTIFIER SERVICE**Maximum Ratings, Absolute Values:**

PEAK INVERSE ANODE VOLTAGE	40000 max.	volts
PEAK ANODE CURRENT	750 max.	ma.
AVERAGE ANODE CURRENT.	100 max.	ma.

SURGE-LIMITING DIODE SERVICE**Maximum Ratings, Absolute Values:**

FILAMENT VOLTAGE	5.8 max.	volts
PEAK FORWARD ANODE VOLTAGE	12500 max.	volts
AVERAGE ANODE DISSIPATION.	75 max.	watts

Typical Operation:

Filament Voltage	5.5	volts
Peak Forward Anode Voltage	10000	volts
Minimum Peak Anode Current	2	amp

MAY 1, 1946

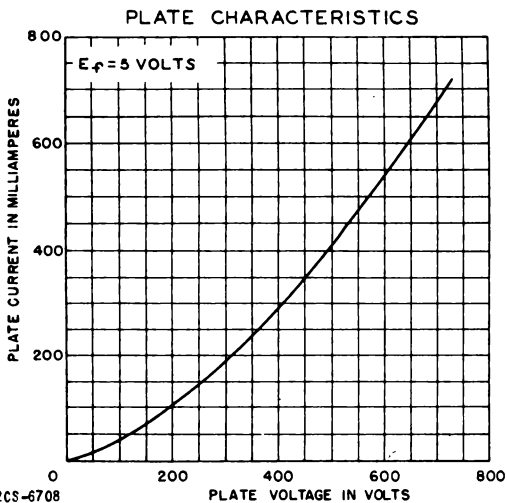
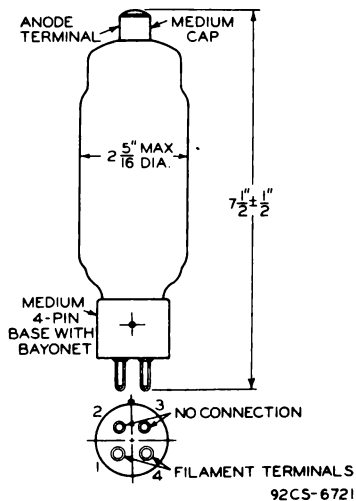
TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA

8020



HALF-WAVE HIGH-VACUUM RECTIFIER



MAY 1, 1946

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-6721-6708



9001

9001

DETECTOR AMPLIFIER PENTODE

MIDGET TYPE

Heater	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.15	amp.
Direct Interelectrode Capacitances:		
Grid to Plate	0.01 max.	μf
Input	3.6	μf
Output	3.0	μf

Maximum Overall Length 1-13/16"
 Maximum Seated Height 1-9/16"

Length from Base Seat to Bulb Top (excluding tip) 1-3/16" $\pm$ 3/32"*

Maximum Diameter 3/4"

Bulb T-5-1/2

Base▲ Miniature Button 7-Pin

Pin 1 - Grid Pin 5 - Plate

Pin 2 - Cathode Pin 6 - Screen

Pin 3 - Heater Pin 7 - { Cathode, Grid No. 3, Internal Shield

Pin 4 - Heater



RCA Socket Stock No. 9914

Mounting Position BOTTOM VIEW Any

Maximum and Minimum Ratings Are Design-Center Values

AMPLIFIER

Plate Voltage	250 max.	volts
Screen Voltage	100 max.	volts
Grid Voltage	-3 min.	volts
Plate Dissipation	0.5	watt
Screen Dissipation	0.1	watt

Typical Operation and Characteristics - Class A₁ Amplifier:

Plate Voltage	90	250	volts
Screen Voltage	90	100	volts
Grid Voltage	-3	-3	volts
Plate Resistance	1.0	• approx.	megohm
Transconductance	1100	1400	μmhos
Plate Current	1.2	2.0	ma.
Screen Current	0.5	0.7	ma.

Typical Operation as Mixer in Superheterodyne Circuit:

Plate Voltage	100	250	volts
Screen Voltage	100	100	volts
Grid Voltage #	-5	-5	approx. volts
Conversion Transconductance	-	550	approx. μmhos

Shielding and r-f by-passing of each r-f amplifier stage may be required in order to prevent interstage coupling and to provide the shortest possible circuit returns when the tube is operated at the ultra-high frequencies. R-f by-passing can be accomplished by the use of small condensers having short leads placed close to the tube terminals. It may also be advisable in some applications to supplement the action of the by-pass condensers by r-f chokes close to the condensers in the return or supply leads for the grid, screen,

■, ▲, • #: See next page.

*Temporary minimum length = 1-1/16".

← Indicates a change.

OCT. 1, 1943

RCA VICTOR DIVISION
 RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA

9001



9001

DETECTOR AMPLIFIER PENTODE

(continued from preceding page)

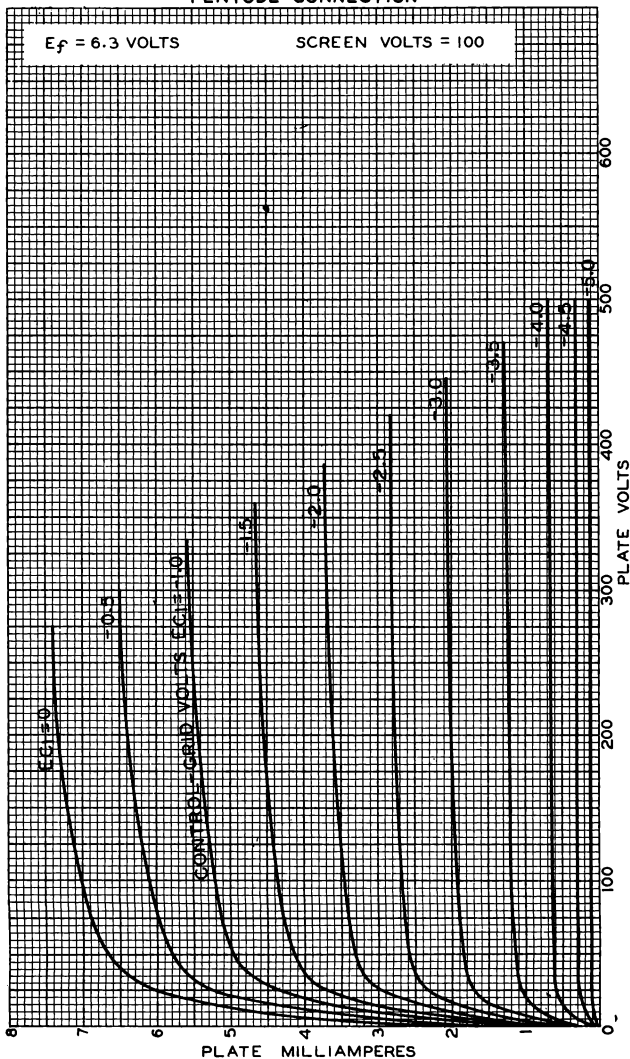
plate and heater. The 9001 has two cathode leads in order that the plate and screen r-f circuits may be completed with a minimum of circuit inductance in common with the grid circuit. The grid return may be connected to one cathode terminal and the plate and screen returns may be connected to the other cathode terminal.

- The cathode of the 9001, when operated from a transformer, should preferably be connected to the heater circuit. In the case of d-c operation of the heater from a storage battery, the cathode circuit is tied in either directly or through bias resistors to the negative battery terminal. In circuits where the cathode is not directly connected to the heater, the potential difference between heater and cathode should be kept as low as possible.
- Greater than 1.0 megohm.
- # The grid bias is minimum for an oscillator peak voltage of 4 volts. These values are optimum.
- ▲ *The center hole in sockets designed for this base provides for the possibility that this tube type may be manufactured with the exhaust-tube tip at the base end. For this reason, it is recommended that in equipment employing this tube type, no material be permitted to obstruct the socket hole..*



9001

AVERAGE PLATE CHARACTERISTICS PENTODE CONNECTION



MAY 22, 1941

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6291

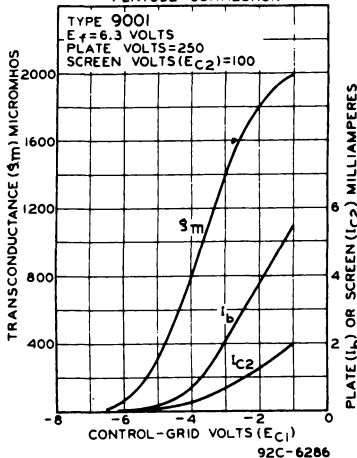
9001



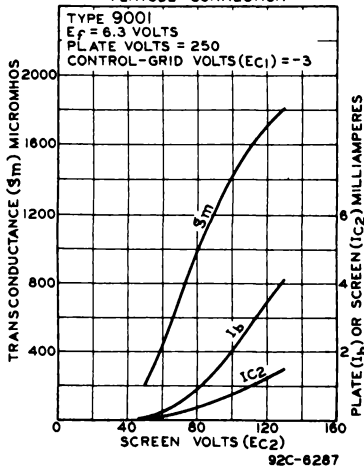
9001

DETECTOR AMPLIFIER PENTODE

AVERAGE CHARACTERISTICS
PENTODE CONNECTION



AVERAGE CHARACTERISTICS
PENTODE CONNECTION



July 1, 1941

RCA RADOTRON DIVISION
 RCA MANUFACTURING COMPANY, INC.

92C-6286
 92C-6287



9002

9002

DETECTOR, AMPLIFIER, OSCILLATOR

MIDGET TYPE

Heater ■	Coated Unipotential Cathode	•
Voltage	6.3	a-c or d-c volts
Current	0.15	amp.
Direct Interelectrode Capacitances:		
Grid to Plate	1.4	μf
Grid to Cathode	1.2	μf
Plate to Cathode	1.1	μf
Maximum Overall Length		1-13/16"
Maximum Seated Height		1-9/16"
Length from Base Seat to Bulb Top (excluding tip)		1-3/16" ± 3/32" ←
Maximum Diameter		3/4"
Bulb		T-5-1/2
Base ▲		Miniature Button 7-Pin
Pin 1 - Plate		Pin 5 - Plate
Pin 2 - Cathode		Pin 6 - Grid
Pin 3 - Heater		Pin 7 - Cathode
Pin 4 - Heater		



RCA Socket	Stock No. 9914 ←
Mounting Position	Any

BOTTOM VIEW

*Maximum Ratings Are Design-Center Values***AMPLIFIER**

Plate Voltage				250 max. volts
Plate Dissipation				1.6 max. watts ←
<i>Typical Operation and Characteristics - Class A₁ Amplifier:</i>				
Plate	90	135	180	250 volts
Grid	-2.5	-3.75	-5	-7 volts
Amp. Fact.	25	25	25	25
Plate Res.	14700	13200	12500	11400 ohms
Transcond.	1700	1900	2000	2200 μmhos
Plate Cur.	2.5	3.5	4.5	6.3 ma.

■ The cathode of the 9002, when operated from a transformer, should preferably be connected to the heater circuit. In the case of d-c operation of the heater from a storage battery, the cathode circuit is tied in either directly or through bias resistors to the negative battery terminal. In circuits where the cathode is not directly connected to the heater, the potential difference between heater and cathode should be kept as low as possible.

▲ The center hole in sockets designed for this base provides for the possibility that this tube type may be manufactured with the exhaust-tube tip at the base end. For this reason, it is recommended that in equipment employing this tube type, no material be permitted to obstruct the socket hole.

*Temporary minimum length = 1-1/16".

← Indicates a change.

OCT. 1, 1943

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

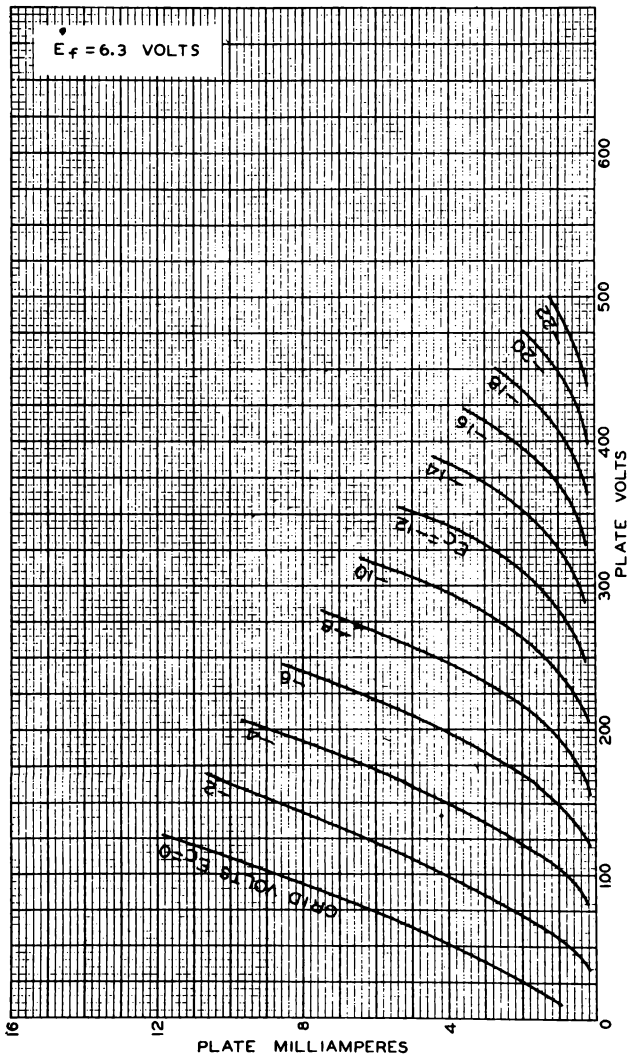
DATA

9002



9002

AVERAGE PLATE CHARACTERISTICS



SEPT. 17, 1943

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA HARRISON, NEW JERSEY

92C-6284



9003

9003

SUPER-CONTROL R-F AMPLIFIER PENTODE

MIDGET TYPE

Heater	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.15	amp.
Direct Interelectrode Capacitances:		
Grid to Plate	0.01 max.	μmf
Input	3.4	μmf
Output	3.0	μmf
Maximum Overall Length		1-13/16"
Maximum Seated Height		1-9/16"
Length from Base Seat to Bulb Top (excluding tip)		1-3/16" $\pm$ 3/32"
Maximum Diameter		3/4"
Bulb		T-5-1/2
Base [▲]	Miniature Button 7-Pin	
Pin 1 - Grid	Pin 5 - Plate	
Pin 2 - Cathode	Pin 6 - Screen	
Pin 3 - Heater	Pin 7 - { Cathode, Grid No. 3, Internal Shield	
Pin 4 - Heater		



RCA Socket

Mounting Position

BOTTOM VIEW

Stock No. 9914

Any

Maximum and Minimum Ratings Are Design-Center Values
AMPLIFIER

Plate Voltage	250 max.	volts
Screen Voltage	100 max.	volts
Grid Voltage	-3 min.	volts
Plate Dissipation	1.7 max.	watts
Screen Dissipation	0.3 max.	watt

Typical Operation and Characteristics - Class A₁ Amplifier:

Plate Voltage	250	volts
Screen Voltage	100	volts
Grid Voltage	-3	volts
Plate Resistance	0.7 approx.	megohm
Transconductance	1800	μmhos
Grid Bias for Transcond. of 15 μmhos	-35	volts
Grid Bias for Transcond. of 2 μmhos	-45	volts
Plate Current	6.7	ma.
Screen Current	2.7	ma.

Typical Operation as Mixer in Superheterodyne Circuit:

Plate Voltage	100	250	volts
Screen Voltage	100	100	volts
Grid Voltage #	-10	-10 approx.	volts
Conversion Transconductance	-	600 approx.	μmhos

The grid bias is minimum for an oscillator peak voltage of 9 volts.
 These values are optimum.

▲ The center hole in sockets designed for this base provides for the possibility that this tube type may be manufactured with the exhaust-tube tip at the base end. For this reason, it is recommended that in equipment employing this tube type, no material be permitted to obstruct the socket hole.

Shielding Considerations & Heater-Cathode Connections*
 for the 9003 are the same as for Type 9001.

← Indicates a change.

* Temporary minimum length = 1-1/16".

OCT. 1, 1943

RCA VICTOR DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

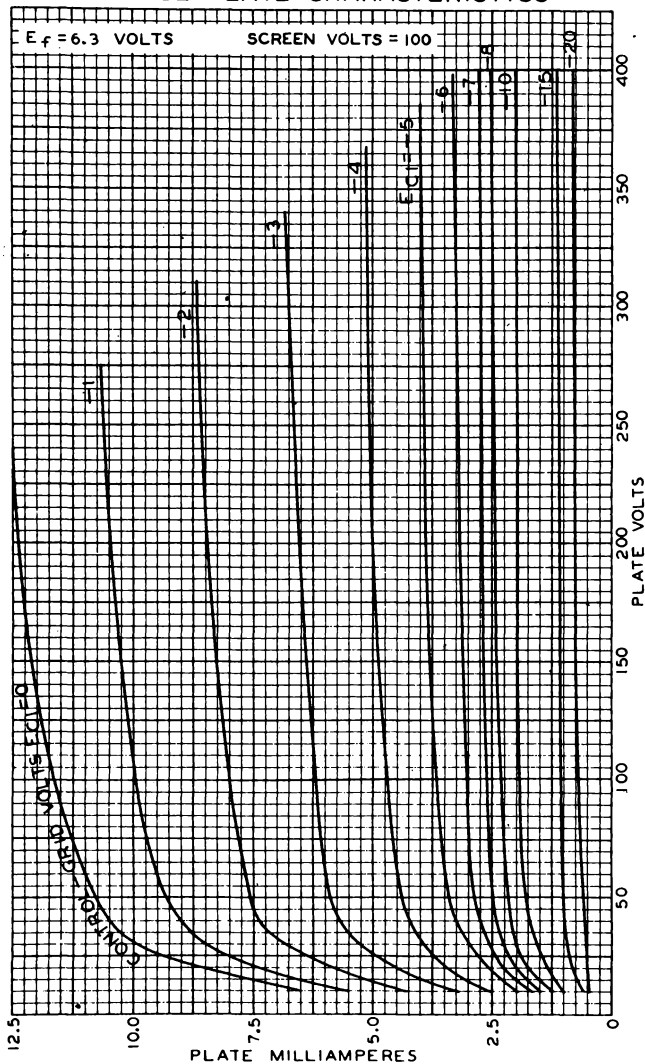
DATA

9003



9003

AVERAGE PLATE CHARACTERISTICS



SEPT. 17, 1943

 RCA VICTOR DIVISION
 RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

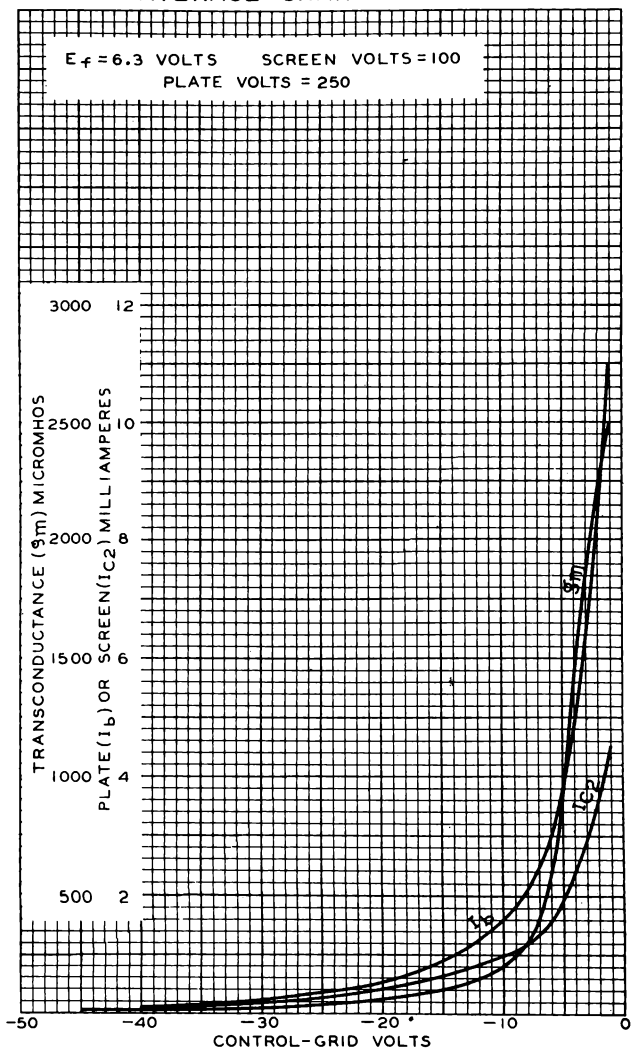
92C-6288



9003

9003

AVERAGE CHARACTERISTICS



MAY 29, 1941

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

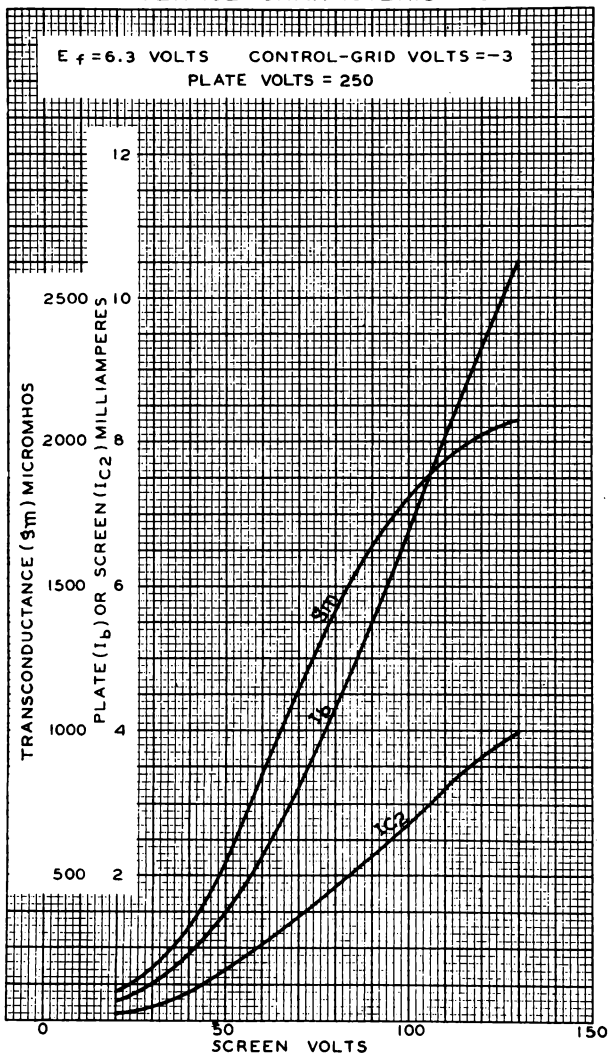
92C-6289

9003



9003

AVERAGE CHARACTERISTICS



MAY 29, 1941

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6290



9004

9004

U-H-F DIODE

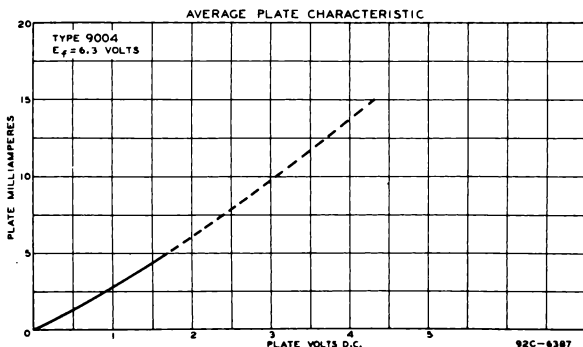
ACORN TYPE

Heater	Coated Unipotential Cathode		
Voltage	6.3	a-c or d-c volts	
Current	0.15	amp.	
Direct Interelectrode Capacitances: ^o			
Plate to Cathode	1.3	μf	
Plate to Heater	0.3 approx.	μf	
Heater to Cathode	2.2 approx.	μf	
Overall Length		$1-7/32" \pm 5/32"$	
Overall Diameter		$1-3/32" \pm 1/16"$	
Bulb		T-4 $\frac{1}{2}$	
RCA Socket		Stock No. 9925	
Mounting Position		Any	

*Maximum Ratings Are Design-Center Values*RECTIFIER

A-C Plate Voltage (RMS)	117 max. volts
D-C Output Current	5 max. ma.

The resonant frequency of the 9004 is approximately 850 Mc

^oWith no external shield.

Dec. 1, 1942

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

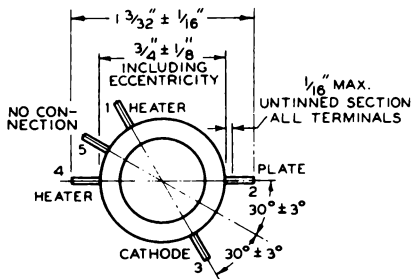
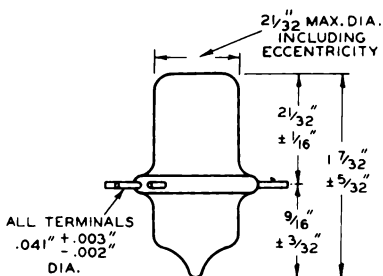
TENTATIVE DATA

9004



9004

U-H-F DIODE



BOTTOM VIEW

92C-6353R1

← Indicates a change.

Dec. 1, 1942

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6353R1



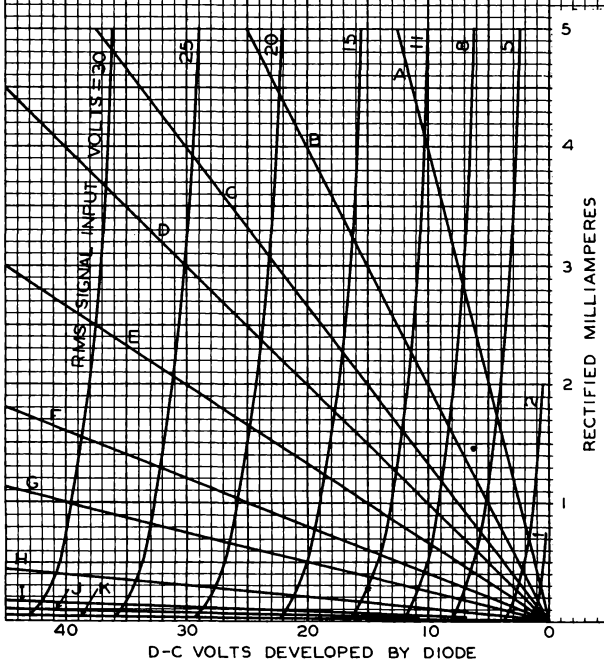
9004

9004

AVERAGE CHARACTERISTICS

 $E_f = 6.3$ VOLTS

CURVE	LOAD RESISTOR OHMS
A	2500
B	5000
C	7500
D	10000
E	15000
F	25000
G	40000
H	100000
I	250000
J	500000
K	1000000



MARCH 18, 1942

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6383



9005

9005

U-H-F DIODE

ACORN TYPE

Heater	Coated Unipotential Cathode	
Voltage	3.6	a-c or d-c volts
Current	0.165	amp.
Direct Interelectrode Capacitances: ^o		
Plate to Cathode	0.8	$\mu\mu\text{f}$
Plate to Heater	0.2 approx.	$\mu\mu\text{f}$
Heater to Cathode	1.1 approx.	$\mu\mu\text{f}$
Overall Length	1-7/32"	$\pm 5/32$ "
Overall Diameter	1-3/32"	$\pm 1/16$ "
Bulb	T-4 $\frac{1}{2}$	
RCA Socket		Stock No. 9925
Mounting Position		Any

Maximum Ratings are Design-Center Values

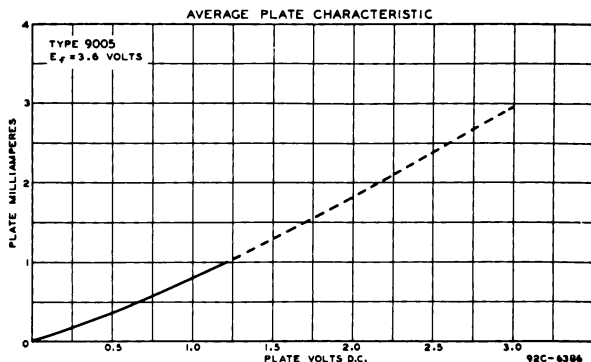
RECTIFIER

A-C Plate Voltage (RMS) 117 max. volts

D-C Output Current 1.0 max. ma.

The resonant frequency of the 9005 is approximately 1500 Mc.

^oWith no external shield.



Dec. 1, 1942

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

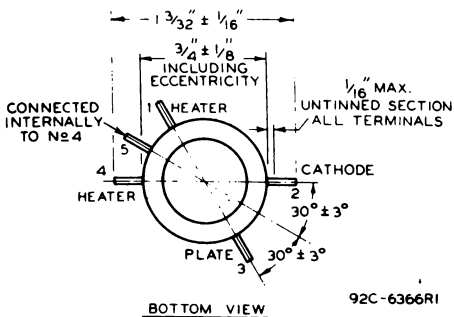
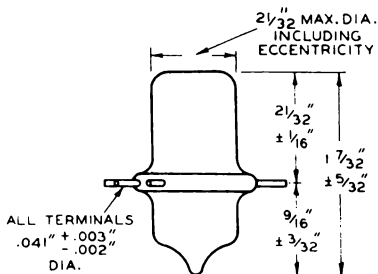
TENTATIVE DATA

9005



9005

U-H-F DIODE



92C-6366R1

< Indicates a change.

Dec. 1, 1942

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RCA MANUFACTURING COMPANY, INC.

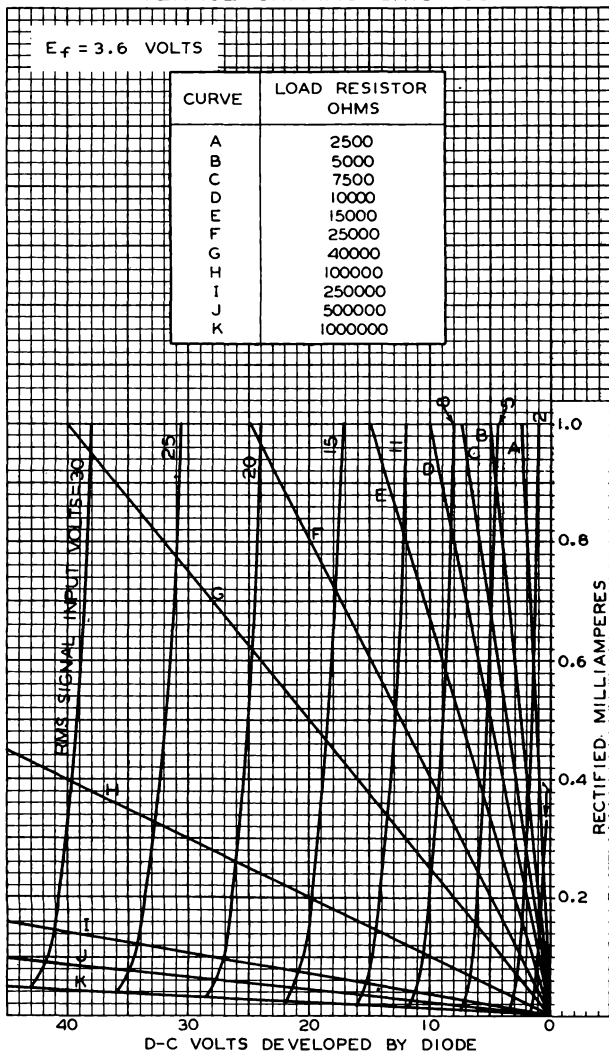
92C-6366R1



9005

9005

AVERAGE CHARACTERISTICS



MARCH 20, 1942

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6384



9006

9006

U-H-F DIODE

MIDGET TYPE

Heater	Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.15	amp.
Direct Interelectrode Capacitances:*		
Plate to Cathode	1.4	μf
Plate to Heater	0.2	μf
Cathode to Heater	2.2	μf
Maximum Overall Length		1-13/16"
Maximum Seated Height		1-9/16"
Length from Base Seat to Bulb Top (excluding tip)		1-3/16 $\pm$ 3/32"
Maximum Diameter		3/4"
Bulb		T-5-1/2
Base [▲]		Miniature Button 7-Pin
Pin 1 - Plate		Pin 5 - Plate
Pin 2 - Cathode		Pin 6 - No Connection
Pin 3 - Heater		Pin 7 - Cathode
Pin 4 - Heater		
RCA Socket		Stock No. 9914
Mounting Position	BOTTOM VIEW (6BH)	Any
<i>Maximum Ratings Are Design-Center Values</i>		

RECTIFIER

Peak Inverse Plate Voltage	750 max. volts
Peak Plate Current	15 max. ma.
U-C Output Current	5 max. ma.
D-C Heater-Cathode Potential	100 max. volts
<i>Typical Operation as Rectifier:</i>	
A-C Plate Supply Voltage (RMS)	270 volts
Min. Total Effective Plate-Supply Impedance	100 ohms
D-C Output Current	5 ma.

• With no external shield.

The resonant frequency of the 9006 is 700 megacycles (approx).

▲ The center hole in sockets designed for this base provides for the possibility that this tube type may be manufactured with the exhaust-tube tip at the base end. For this reason, it is recommended that in equipment employing this tube type, no material be permitted to obstruct the socket hole.

*Temporary minimum length = 1-1/16".

OCT. 1, 1943

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

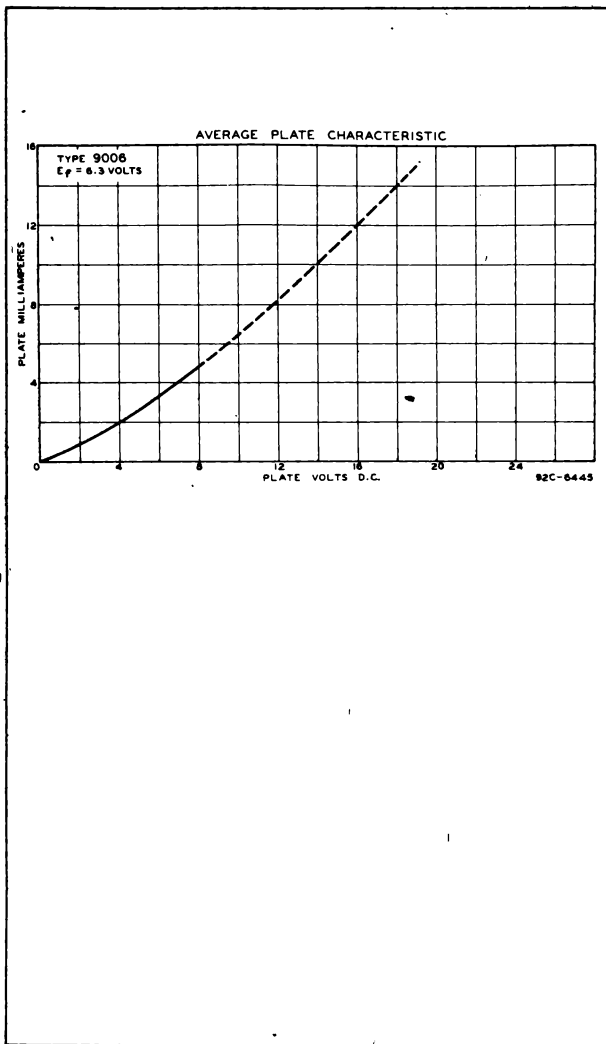
DATA

9006



9006

U-H-F DIODE



OCT. 1, 1943

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-6445

**RCA TUBE
HANDBOOK
HB-3**

**RECEIVING
TUBE
SECTION—Part 1**

Up to Type 6A3



RECEIVING TUBES—PART 1

In this section, data are given for those types of RCA tubes employed primarily in broadcast and home-television receivers. These types are also used in many other applications.

*For further Technical Information, write to
Commercial Engineering, Tube Department,
Radio Corporation of America, Harrison, N. J.*



PRICES[□] OF RECEIVING TUBE TYPES

Schedule D[®]

Type	Price	Type	Price	Type	Price
OY4.....\$	•	1N5-GT†....\$	2.40	6AB5/6N5*..\$	3.15
OZ4.....	1.65	1P5-GT.....	•	6AB7†*.....	3.60
OZ4-G.....	1.65	1Q5-GT†*....	3.05	6AC5-GT†*..	3.00
1A3.....	2.50	1R5.....	2.35	6AC7†.....	3.35
1A4-P.....	•	1S4.....	2.45	6AD7-G.....	3.90
1A5-GT†*....	2.05	1S5.....	2.05	6AF4.....	4.05
1A6.....	•	1T4.....	2.25	6AF6-G*....	3.15
1A7-GT†....	2.45	1T5-GT*....	2.80	6AG5.....	2.25
1AC5.....	3.00	1T6.....	3.00	6AG7.....	3.75
1AD5.....	3.00	1U4.....	2.25	6AH4-GT....	2.35
1B3-GT†....	2.65	1U5.....	2.00	6AH6.....	3.90
1B4-P.....	•	1V.....	2.55	6AK5.....	4.35
1B5/25S.....	•	1V2.....	1.70	6AK6.....	2.55
1C5-GT†....	2.60	1X2-A.....	2.65	6AL5.....	1.75
1C6.....	•	2A3.....	4.15	6AL7-GT....	2.90
1C7-G.....	•	2A5.....	•	6AQ5.....	2.10
1D5-GP.....	•	2A6.....	•	6AQ6.....	1.85
1D5-GT.....	•	2A7.....	•	6AQ7-GT....	2.65
1D7-G.....	•	2B7.....	•	6AR5.....	1.65
1D8-GT*....	4.05	2E5.....	•	6AS5.....	2.10
1E5-GP.....	•	3A8-GT.....	•	6AS7-G.....	7.10
1E7-GT.....	•	3LF4.....	2.80	6AT6.....	1.65
1E8.....	3.00	3Q4.....	2.25	6AU5-GT....	3.20
1F4.....	•	3Q5-GT†....	2.80	6AU6.....	1.85
1F5-G.....	•	3S4.....	2.20	6AV5-GT....	2.65
1F6.....	•	3V4.....	2.20	6AV6.....	1.65
1F7-G.....	•	5AZ4.....	1.55	6AX4-GT....	2.55
1G4-GT†....	•	5T4*.....	5.00	6AX5-GT....	2.00
1G5-G.....	•	5U4-G.....	1.75	6B4-G.....	3.20
1G6-GT†*....	3.00	5V4-G.....	2.80	6B5.....	•
1H4-G.....	•	5W4.....	•	6B6-G.....	•
1H5-GT†....	1.95	5W4-GT†*....	1.75	6B7.....	•
1H6-G.....	•	5X4-G*.....	2.00	6B8*.....	3.35
1J6-GT.....	•	5Y3-G*.....	1.35	6B8-G.....	•
1L4.....	2.25	5Y3-GT.....	1.35	6BA6.....	1.95
1L6.....	2.75	5Y4-G*.....	1.70	6BA7.....	2.50
1LA4*.....	2.65	5Z3*.....	2.00	6BC5.....	2.00
1LA6.....	2.65	5Z4.....	3.30	6BD6.....	2.00
1LB4.....	2.65	6A3*.....	3.35	6BE6.....	2.05
1LC5.....	2.65	6A6.....	•	6BF5.....	2.35
1LC6.....	2.65	6A7*.....	2.75	6BF6.....	1.75
1LD5.....	2.65	6A7S.....	•	6BG6-G.....	5.25
1LE3.....	2.65	6A8*.....	2.70	6BH6.....	2.30
1LG5.....	2.65	6A8-G*.....	2.75	6BJ6.....	2.10
1LH4.....	2.65	6A8-GT*....	2.75	6BL7-GT....	2.90
1LN5.....	2.65	6AB4.....	2.00	6BQ6-GT....	3.80

For Footnotes, see end of list.

(Continued on next page)

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TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

REC. TUBE
PRICES 1



PRICES OF RECEIVING TUBE TYPES

Schedule D[®]

Type	Price	Type	Price	Type	Price
6BQ7.....\$	•	6Q7\$.....\$	2.40	7A4.....\$	2.00
6BQ7-A.....	3.50	6Q7-G.....	•	7A5.....	2.35
6C4.....	1.65	6Q7-GT\$....	2.10	7A6.....	2.10
6C5.....	1.95	6R7\$.....	2.80	7A7.....	2.00
6C5-GT†...	1.65	6R7-GT†....	•	7A8.....	1.90
6C6\$.....	2.50	6S4.....	1.90	7AD7.....	4.60
6C8-G.....	3.90	6S7\$.....	3.25	7AF7.....	1.80
6CB6.....	2.10	6S7-G.....	•	7AG7.....	2.45
6CD6-G.....	5.90	6S8-GT.....	2.65	7AH7.....	2.45
6CF6.....	2.50	6SA7.....	2.10	7B4.....	1.80
6CL6.....	3.35	6SA7-GT†\$..	2.10	7B5.....	1.85
6D6\$.....	2.50	6SB7-Y\$....	2.90	7B6.....	2.00
6D8-G.....	•	6SC7.....	2.35	7B7.....	2.00
6E5.....	2.55	6SF5.....	1.95	7B8.....	2.05
6F5\$.....	1.90	6SF5-GT.....	1.80	7C5.....	2.00
6F5-GT\$....	1.85	6SF7\$.....	2.30	7C6.....	1.85
6F6.....	2.45	6SG7.....	2.30	7C7.....	2.05
6F6-G\$....	2.00	6SH7.....	2.50	7E6.....	2.90
6F7\$.....	3.90	6SJ7.....	2.00	7E7\$.....	3.20
6F8-G.....	3.90	6SJ7-GT....	1.65	7F7.....	2.45
6G6-G\$....	2.75	6SK7.....	2.00	7F8.....	2.90
6H6.....	2.00	6SK7-GT†\$..	2.00	7G7.....	2.75
6H6-GT†\$..	2.10	6SL7-GT.....	2.65	7H7.....	2.20
6J5.....	1.70	6SN7-GT.....	2.35	7J7.....	3.25
6J5-GT.....	1.80	6SQ7.....	1.75	7K7.....	2.75
6J6.....	2.50	6SQ7-GT†\$..	1.75	7L7.....	2.75
6J7.....	2.50	6SR7.....	1.85	7M7.....	2.20
6J7-G.....	•	6SS7\$.....	2.40	7Q7.....	2.40
6J7-GT\$....	2.55	6ST7\$.....	2.70	7R7.....	3.35
6J8-G\$....	3.20	6SZ7\$.....	2.45	7S7.....	•
6K5-GT†....	•	6T7-G.....	•	7V7.....	3.35
6K6-GT†....	1.80	6T8.....	2.90	7W7.....	3.35
6K7\$.....	2.10	6U5 ^o \$.....	2.25	7X7.....	2.65
6K7-G\$....	2.40	6U7-G\$....	2.40	7Y4.....	1.80
6K7-GT\$....	2.35	6U8.....	2.90	7Z4.....	1.80
6K8.....	3.05	6V6.....	3.40	10.....	\$
6K8-G.....	•	6V6-GT.....	2.00	12A7.....	•
6K8-GT.....	•	6W4-GT.....	1.90	12A8-GT†\$..	2.75
6L5-G.....	•	6W6-GT.....	2.45	12AH7-GT\$..	3.05
6L6.....	4.60	6W7-G.....	•	12AL5.....	1.80
6L6-G.....	3.35	6X4.....	1.50	12AQ5.....	2.10
6L7.....	2.90	6X5\$.....	3.10	12AT6.....	1.65
6L7-G.....	•	6X5-GT†....	1.55	12AT7.....	2.90
6M6-G.....	•	6X8.....	2.95	12AU6.....	1.85
6N7\$.....	2.95	6Y6-G.....	2.55	12AU7.....	2.40
6N7-GT†....	2.85	6Z7-G.....	•	12AV6.....	1.65
6P5-GT†....	•	6ZY5-G.....	•	12AW6.....	2.65

For Footnotes, see end of list.

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TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

REC. TUBE
PRICES 1



PRICES OF RECEIVING TUBE TYPES

*Schedule D**

Type	Price	Type	Price	Type	Price
12AX4-GT...\$	2.65	14E6.....\$	•	36.....\$	•
12AX7.....	2.50	14E7.....	•	37.....	•
12BA6.....	1.95	14F7.....	2.45	38.....	•
12BA7.....	2.50	14F8.....	3.20	39/44.....	•
12BD6.....	2.00	14H7.....	2.40	41.....	1.90
12BE6.....	2.05	14J7.....	•	42.....	1.90
12BF6.....	1.75	14N7.....	•	43.....	2.05
12BH7.....	2.75	14Q7.....	2.40	45.....	2.10
12C8.....	3.90	14R7.....	3.35	45Z3.....	•
12F5-GT....	•	19.....	•	45Z5-GT...	•
12H6.....	2.00	19BG6-G....	6.00	46.....	•
12J5-GT.....	1.80	19J6.....	2.65	47.....	2.90
12J7-GT.....	2.55	19T8.....	2.90	49.....	•
12K7-GT.....	2.35	19X8.....	3.10	50.....	•
12K8.....	3.15	24-A.....	2.70	50A5.....	2.20
12Q7-GT.....	2.10	25A6.....	3.40	50B5.....	2.10
12S8-GT....	•	25A6-GT/G..	•	50C5.....	2.05
12SA7.....	2.10	25AC5-GT↑..	•	50C6-G....	2.90
12SA7-GT....	2.10	25B5.....	•	50L6-GT...	1.95
12SC7.....	2.50	25BQ6-GT....	3.90	50X6.....	2.20
12SF5.....	2.10	25C6-G.....	•	50Y6-GT...	2.15
12SF5-GT...	•	25L6.....	3.90	50Y7-GT...	2.10
12SF7.....	2.40	25L6-GT....	1.95	50Z7-G....	•
12SG7.....	2.35	25W4-GT.....	2.05	53.....	•
12SH7.....	2.50	25Z5.....	1.80	55.....	•
12SJ7.....	2.00	25Z6.....	2.60	56.....	1.85
12SJ7-GT...	•	25Z6-GT↑...	1.80	57.....	2.10
12SK7.....	2.00	26.....	2.05	58.....	2.10
12SK7-GT.....	2.00	27.....	1.75	59.....	•
12SL7-GT...	2.65	30.....	•	70L7-GT.....	3.90
12SN7-GT...	2.30	31.....	•	71-A.....	2.35
12SQ7.....	1.75	32.....	•	75.....	2.00
12SQ7-GT...	1.75	32L7-GT....	•	76.....	1.70
12SR7.....	2.00	33.....	•	77.....	2.15
12V6-GT....	2.10	34.....	•	78.....	2.15
12X4.....	1.50	35.....	•	79.....	•
12Z3.....	•	35A5.....	2.05	80.....	1.55
14A4.....	•	35B5.....	2.10	81.....	•
14A5.....	•	35C5.....	2.05	82.....	•
14A7.....	2.20	35L6-GT....	1.95	83.....	2.85
14AF7.....	2.40	35W4.....	1.35	83-V.....	3.40
14B6.....	2.20	35Y4.....	1.80	84/6Z4.....	1.80
14B8.....	2.20	35Z3.....	1.80	85.....	•
14C5.....	2.75	35Z4-GT.....	1.45	89.....	•
14C7.....	2.40	35Z5-GT↑...	1.40	117L7-GT/ 117M7-GT.	3.90

For Footnotes, see end of list.

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TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

REC. TUBE
PRICES 2



PRICES OF RECEIVING TUBE TYPES

*Schedule D**

Type	Price	Type	Price	Type	Price
117N7-GT†..\$	4.80	117Z4-GT...\$	•	876.....	•
117P7-GT†..	4.80	117Z6-GT†‡	2.95	886.....	•
117Z3.....	1.80				

- This price list applies only in the United States of America and is subject to change without notice. The price includes Federal Excise Tax, where applicable. All prices are exclusive of any state and local excise, sales and similar taxes.
- Schedule D shows list prices for tube types priced for distribution through dealer and service channels.
- * See 1F7-GV for data.
- † For data, refer to corresponding type with -GT/G suffix or to double-branded type having -GT and -G suffix.
- Discontinued type. Data sheets have been retained in book for reference purposes only.
- ‡ Not recommended for new equipment design.
- See 6U5/6G5 for data.
- § Discontinued type. Replace by Type 10-Y.

INFORMATION ON PURCHASING ABOVE TYPES

Information as to where RCA Receiving Tubes can be purchased may be obtained from our regional office nearest you or from Tube Department, Radio Corporation of America, Harrison, New Jersey.

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TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

REC. TUBE
PRICES 2



RECEIVING TUBE CLASSIFICATION CHART

This chart is designed to help tube users in identifying type designations and characteristics of RCA Receiving Tubes—tubes which are used primarily in AM, FM, and television broadcast receivers. It is so arranged as to permit quick determination of the type designations of RCA receiving tubes according to their functions and cathode voltages. Types having similar characteristics and the same filament or heater voltage are bracketed.



RECEIVING TUBE

Types having similar characteristics and

Filament or Heater Volts			1.25—1.4		
			Sub-miniature	Miniature	Other
RECTIFIERS (For rectifiers with amplifier units, see POWER AMPLIFIERS).					
Half-Wave	vacuum	Peak Inverse Volts: Below 1500			
		Above 1500		1V2 (1X2-A) (1X2-B)	1B3-GT
Full-Wave	vacuum	Peak Inverse Volts: Below 1500			
		Above 1500			
	mercury-vapor	Above 1500			
	gas	Below 1500			
Doubler	vacuum	Peak Inverse Volts: Below 1500			
DIODE DETECTORS (For diode detectors with amplifier units, see VOLT-					
One Diode				1A3	
Two Diodes					
Three Diodes					
POWER AMPLIFIERS with and without Rectifiers, Diode Detectors, and					
Triodes	low-mu	single unit			
	high-mu	single unit			
		twin unit			



CLASSIFICATION CHART

the same filament or heater voltage are bracketed.

2.0—5.0		6.3—117.0		
Octal	Other	Miniature	Octal	Other
		35W4 117Z3	6AX4-GT 6W4-GT 12AX4-GT 25W4-GT (35Z4-GT 35Z5-GT)	1-v 35Y4 35Z3
3A3	3A2		6AU4-GT	
(5Y3-G, 5Z4 5Y3-GT, 5Y4-G (5V4-G, 5W4-GT 83-v)	5A24 80	(6X4 12X4	6X5, 6X5-GT 6AX5-GT	7Y4 7Z4 84/6Z4
(5T4, 5U4-G 5X4-G	5Z3			
	83			
Cold-Cathode Types 0Z4, 0Z4-G				
			(25Z6, 25Z6-GT (50Y6-GT 50Y7-GT 117Z6-GT	25Z5) 50X6
AGE AMPLIFIERS and also POWER AMPLIFIERS).				
		6AL5 12AL5	(6H6, 6H6-GT) 12H6	7A6
		6BC7		
Voltage Amplifiers.				
	2A3 45 71-A		6B4-G	
		6BC4	6AC5-GT	
			6AQ7-GT, (6N7, 6N7-GT)	

When choosing tube types, the equipment designer should refer to the RCA PREFERRED TYPES LIST and its companion list - TYPES NOT RECOMMENDED for NEW EQUIPMENT DESIGN - both of which appear in the General Section.



RECEIVING TUBE

Types having similar characteristics and

Filament or Heater Volts		1.25—1.4		
		Sub-miniature	Miniature	Other
POWER AMPLIFIERS with and without Rectifiers, Diode Detectors, and				
Beam Tubes	single unit			(1Q5-GT) (3Q5-GT*) 3LF4*
	with rectifier			
Pentodes	single unit	IAC5	(1S4) (3S4*) (3Q4*) (3V4*)	1A5-GT 1C5-GT 1LB4
	with medium-mu triode			
	with diode and triode			ID8-GT
GATED AMPLIFIERS				
Pentagrid Amplifier				
SHUNT VOLTAGE REGULATORS				
Beam Triode				

* Filament arranged for either 1.4 or 2.8-volt operation.



CLASSIFICATION CHART

the same filament or heater voltage are bracketed.

2.0—5.0		6.3—117.0		
Octal	Other	Miniature	Octal	Other
Voltage Amplifiers. (Continued)				
		6AS5 6BF5 6AQ5 12AQ5 (35B5, 35C5) (50B5, 50C5)	6AU5-GT 6BC6-G (6L6) 6BQ6-GT 6CD6-G (6L6-G) 6V6 6V6-GT 6AV5-GT 12V6-GT 6Y6-G (25L6) 19BG6-G 6W6-GT (25L6-GT) 25BQ6-GT 50C6-G 50L6-GT 35L6-GT	7A5 7C5 14C5 35A5 50A5
			(117L7/M7-GT) 117P7-GT 70L7-GT 117N7-GT	
	47	6CL6 (6AK6 6AR5)	6AG7 (6G6-G) (6F6, 6F6-G, 6F6-GT) (6K6-GT) (25A6 42) 41) 43)	7B5 7AD7
			6AD7-G	
		6BY6		
			6BD4-A	

When choosing tube types, the equipment designer should refer to the RCA PREFERRED TYPES LIST and its companion list - TYPES NOT RECOMMENDED for NEW EQUIPMENT DESIGN - both of which appear in the General Section.



RECEIVING TUBE

Types having similar characteristics and

Filament or Heater Volts		1.25—1.4		
		Sub-miniature	Miniature	Other
VOLTAGE AMPLIFIERS with and without Diode Detectors, TRIODE, TETRODE, AND PENTODE DETECTORS, OSCILLATORS.				
Triodes	medium-mu	single unit		1LE3
		with rf pentode		
		with power pentode		
		with pentode and diode		1D8-GT
		with two diodes		
		twin unit		
	high-mu	single unit		
		with diode		1H5-GT 1LH4
		with two diodes		
		with three diodes		
		twin unit		
Tetrodes	sharp-cutoff			



CLASSIFICATION CHART

the same filament or heater voltage are bracketed.

2.0—5.0		6.3—117.0		
Octal	Other	Miniature	Octal	Other
	27	6AF4 6C4 6S4	(6C5, 6C5-GT) (6J5, 6J5-GT) 12J5-GT 6AH4-GT	7A4
			6F7	
			6AD7-G	
		(6BF6 12BF6	6R7 6SR7 6ST7 12SR7	
		(6BK7-A) 6J6 12AU7 [▲] (6BQ7-A) 19J6 12AV7 [▲] (6BZ7) 12BH7 [▲]	(6F8-G, 6SN7-GT, 6SN7-GTA) 6C8-G 12AH7-GT 6BL7-GT 12SN7-GT	7AF7 14AF7 7F8 14F8 7N7
		6AB4	(6F5, 6F5-GT) (6SF5, 6SF5-GT) 12SF5	7B4
		12AT6 (6AT6 6AQ6 12AV6 6AV6	6Q7 6Q7-GT, 6SZ7 6SQ7, 6SQ7-GT	12Q7-GT (12SQ7 12SQ7-GT)
		6T8 19T8	6S8-GT	7B6 14B6 7C6 75 7K7 7X7
		12AT7 [▲] 12AX7 [▲]	6SC7, 12SC7 6SL7-GT 12SL7-GT	7F7 14F7
	24-A			

[▲] Heater arranged for either 6.3 or 12.6-volt operation.

When choosing tube types, the equipment designer should refer to the RCA PREFERRED TYPES LIST and its companion list - TYPES NOT RECOMMENDED for NEW EQUIPMENT DESIGN - both of which appear in the General Section.



RECEIVING TUBE

Filament or Heater Volts		1.25—1.4			
		Sub-miniature	Miniature	Other	
VOLTAGE AMPLIFIERS with and without Diode Detectors, TRIODE, TETRODE, AND PENTODE DETECTORS, OSCILLATORS.					
Pentodes	remote-cutoff	single unit		1T4	1LG5
		with triode			
		with diode			
		with two diodes			
	semiremote-cutoff	single unit			
	sharp-cutoff	single unit	1AD5	1L4 1U4	1LC5 1LN5 1N5-GT
		with triode			
		with diode	1T6	1S5 1U5	1LD5
CONVERTERS & MIXERS (For other types used as Mixers, see VOLTAGE AMPLIFIERS)					
Converters	pentagrid	1E8	1L6 1R5	1A7-GT 1LA6 1LC6	
	triode-pentode				
	triode-hexode				
	triode-heptode				
	octode				
Mixers	pentagrid				
ELECTRON-RAY TUBES					
Single	with remote-cutoff triode				
	with sharp-cutoff triode				
Twin	without triode				
Triple	without triode				



CLASSIFICATION CHART

2.0—5.0		6.3—117.0		
Octal	Other	Miniature	Octal	Other
		6BJ6 (6BD6 12BD6 6BA6 12BA6)	6SK7, 6SK7-GT) (12SK7, 12SK7-GT) 6SG7 6AB7 12SC7 6SS7 6S7	78) 7A7 14A7 6D6 7H7 14H7 7AH7 7B7
				6F7
			6SF7 12SF7	
			12C8 6B8	7E7 14R7
		6DC6		
		(6AG5 6AK5) (6BC5 6CB6) 6CF6 6AH6 6BH6 12AW6 (6AU6 12BY7* (12AU6	(6SJ7 12SJ7 6AC7 (6SJ7-GT) 12J7-GT 6SH7 (6J7, 6J7-GT 12SH7) 6W7-G	7AG7 7C7 14C7 7L7 7V7 (6C6 77) 7W7
		6AN8		
		6AS8		
AGE AMPLIFIERS).				
		(6BE6 12BE6 12BA7 (6BA7 6X8) 19X8 (6U8 6AT8)	6SA7 6SA7-GT) (6A8, 6A8-G 6A8-GT 6A7) (12SA7 12SA7-GT 7B8 6SB7-Y) 12A8-GT 7Q7 14B8 14Q7	
			6K8, 12K8	
			6J8-G	7J7
				7A8
			6L7	
				6AB5 6N5 6U5
				6E5
			6AF6-G	
			6AL7-GT	

* Heater arranged for either 6.3 or 12.6-volt operation.



DIODE CONSIDERATIONS

DIODE-TRIODE AND DIODE-PENTODE TUBES

Certain multi-unit tubes contain one or more diode plates, each having its own base pin, in addition to a triode or pentode unit. Such types may employ either a unipotential cathode or a filamentary cathode.

In unipotential-cathode tubes the cathode is common to the triode or pentode unit and the diode(s). In filamentary-cathode tubes the filament is likewise common to the triode or pentode unit and the diode(s). However, in filament types, diode operation is affected by the position of the diode plate(s) with respect to the filament, and, therefore, the position of the diode plate(s) is specified on the individual tube data sheets.

The rectifying action of the diode is commonly used for the following purposes:

Detection: Detection may be accomplished by using either a half-wave or full-wave circuit arrangement to supply signal voltage to the triode or pentode unit of the tube or to another amplifier tube. The half-wave circuit will provide approximately twice the rectified voltage obtainable from a full-wave circuit for the same applied signal voltage. Since the amplitude variation of the envelope of the rectified voltage is usually of greater importance than rectifier power, the half-wave circuit is more commonly used in practice.

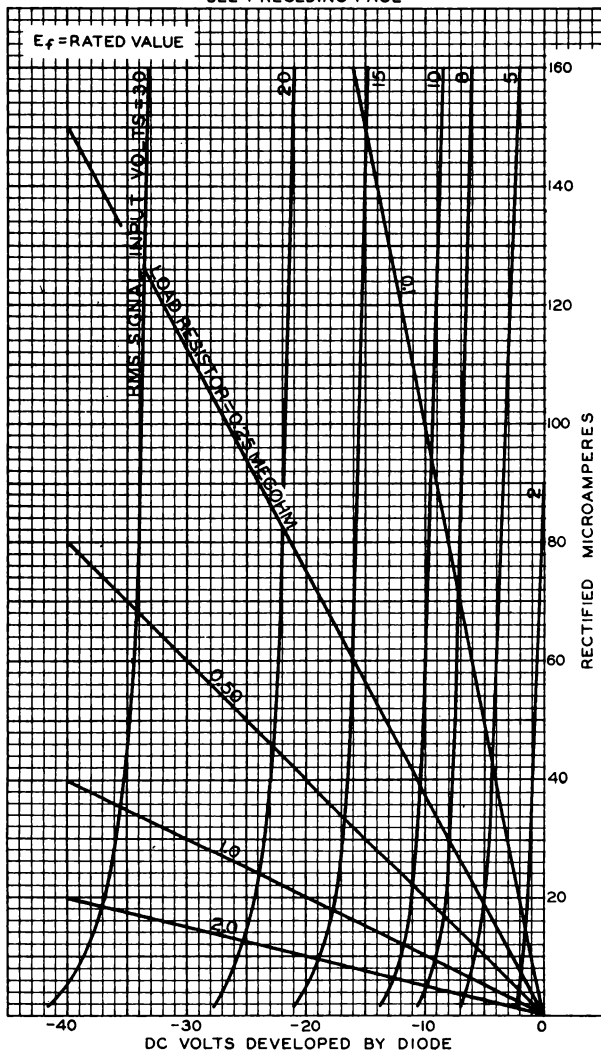
AVC: Regulation of amplifier gain, generally called Automatic Volume Control, may be accomplished by using the output of a diode rectifier in a number of ways. The diode output may be applied to the control grids of the preceding amplifier tubes, or it may be applied, in the case of rf pentodes, to their suppressors, plates and/or screens.

The above functions can be performed simultaneously by using a single diode, two diodes in parallel, or by two diodes operating independently. A number of typical circuit arrangements are shown on the following pages.

Average Characteristic Curves for diodes in diode-triode and diode-pentode tubes are shown on the next page.



AVERAGE DIODE CHARACTERISTICS
HALF-WAVE RECTIFICATION-SINGLE DIODE UNIT
SEE PRECEDING PAGE



JULY 15, 1947

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

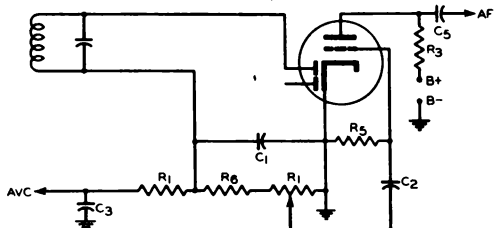
92CM-6875



DIODE CONSIDERATIONS

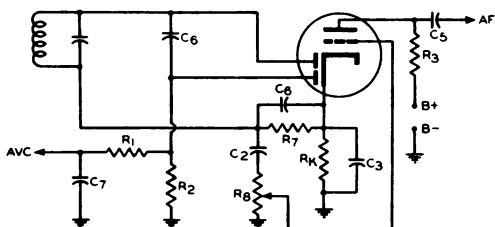
TYPICAL DIODE-TRIODE CIRCUITS

HALF-WAVE DETECTOR, AVC, ZERO-BIAS AMPLIFIER



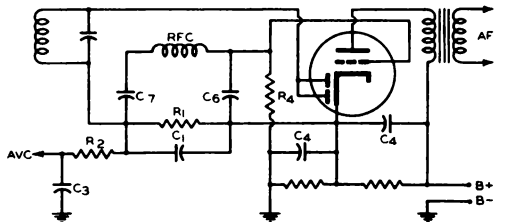
92CS-6677

HALF-WAVE DETECTOR AND DELAYED AVC, CATHODE-BIAS AMPLIFIER



92CS-6679

HALF-WAVE DETECTOR, AVC, FIXED-BIAS AMPLIFIER



92CS-6678A1

TYPICAL VALUES

C1: 150 μ f for
450-1600 kc
C2: 0.01 μ f
C3: 0.1 μ f
C4: 0.5 μ f or larger
C5: 0.01 to 0.1 μ f
or larger

C6: 100 μ f
C7: 0.01 to 0.05 μ f
R1: 0.5 Megohm
R2: 1.0 Megohm

R3: 0.1 Megohm
R4: 0.05 to 1.0
Megohm
R5: 10 Megohms
R6: 22000 Ohms
R7: 0.25 Megohm
R8: 1 to 2 Megohm

DEC. 30, 1947

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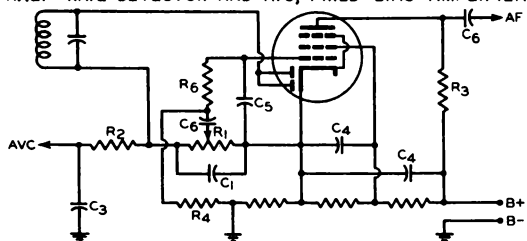
DIODE
CIRCUITS



DIODE CONSIDERATIONS

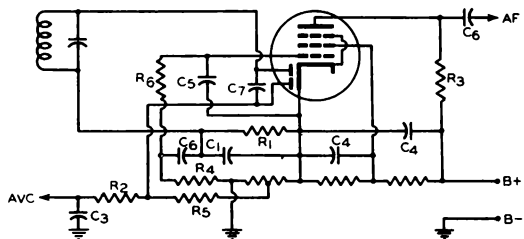
TYPICAL DIODE-PENTODE CIRCUITS

HALF-WAVE DETECTOR AND AVC, FIXED-BIAS AMPLIFIER



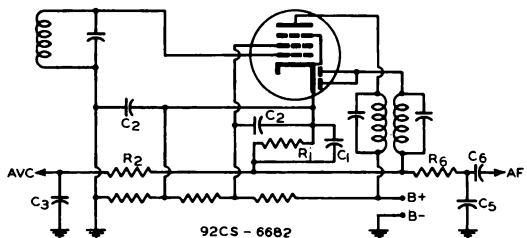
92CS-6681

HALF-WAVE DETECTOR, SEPARATE AVC, FIXED-BIAS AMPLIFIER



92CS-6680

HALF-WAVE DETECTOR, AVC, FIXED-BIAS H-F AMPLIFIER



92CS-6682

TYPICAL VALUES

C1: 150 μ f for 450-1600 kc
C2, C3: 0.1 μ f
C4: 0.5 μ f or larger
C5: 100 μ f or smaller
C6: 0.01 to 0.1 μ f
C7: 500 to 1000 μ f

R1: 0.5 to 1.0 Megohm
R2: 1.0 to 1.5 Megohms
R3: 0.1 to 0.2 Megohm
R4: 0.5 to 1.0 Megohm
R5: 1.0 Megohm
R6: 0.1 to 0.2 Megohm

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DEC. 30, 1947

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DIODE
CIRCUITS



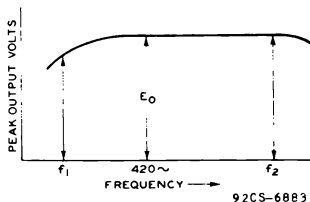
RESISTANCE-COUPLED AMPLIFIERS

Symbols used in the following text and charts are explained at the end of the text.

GENERAL CIRCUIT CONSIDERATIONS

In the discussions which follow, the frequency (f_2) is that value at which the high-frequency response begins to fall off. The frequency (f_1) is that value at which the low-frequency response drops below a satisfactory value, as discussed below. Decoupling filters are not necessary for two stages or less.

A variation of 10 per cent in values of resistors and capacitors has only slight effect on performance. One-half-watt resistors are usually suitable for R_{g2} , R_g , R_p , and R_k resistors. Capacitors C and C_{g2} should have a working voltage equal to or greater than E_{bb} . Capacitor C_k may have a low working voltage in the order of 10 to 25 volts. Peak Input Voltage is equal to the Peak Output Voltage divided by the Voltage Gain.



Triode (Heater-Cathode Type) Amplifier

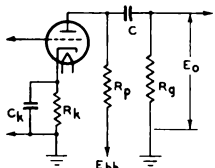


Diagram No. 1

Capacitors C and C_k have been chosen to give an output voltage equal to $0.8 E_0$ for a frequency (f_1) of 100 cycles. For any other values of (f_1), multiply values of C and C_k by $100/f_1$. In the case of capacitor C_k , the values shown in the charts are for an amplifier with dc heater excitation; when ac is used, depending on the character of the associated circuit, the gain, and the value of f_1 , it may be necessary to increase the value of C_k to minimize hum

disturbances. It may be desirable to operate the heater at a positive voltage of from 15 to 40 volts with respect to the cathode. The voltage output at f_1 , of "n" like stage equals $(0.8)^n E_0$ where E_0 is the peak output voltage of the final stage. For an amplifier of typical construction, the value of f_2 is well above the audio-frequency range for any value of R_p .

Pentode (Filament-Type) Amplifier

Capacitors C and C_{g2} have been chosen to give an output voltage equal to $0.8 E_0$ for a frequency (f_1) of 100 cycles. For any other value of f_1 , multiply values of C and C_{g2} by $100/f_1$. The voltage output at f_1 for "n" like stages equals $(0.8)^n E_0$.



RESISTANCE-COUPLED AMPLIFIERS

(continued from preceding page)

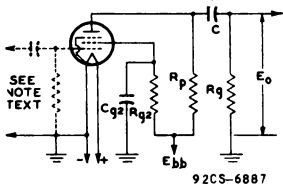


Diagram No. 2

where E_o is the peak output voltage of the final stage. For an amplifier of typical construction, and for R_p values of 0.1, 0.25, and 0.5 megohm, approximate values of f_2 are 20000, 10000, and 5000 cps, respectively.

Note: The values of input coupling capacitor in microfarads and of grid resistor in megohms should be such that their product

lies between 0.02 and 0.1. Values commonly used are $0.005 \mu f$ and 10 megohms.

Pentode (Heater-Cathode Type) Amplifier

Capacitors C , C_k , and C_{g2} have been chosen to give an output voltage equal to $0.7 E_o$ for a frequency (f_1) of 100 cycles. For any other value of f_1 , multiply values of C , C_k , and C_{g2} by $100/f_1$. In the case of capacitor C_k , the values shown in the charts are for an amplifier with dc heater excitation; when ac is used, depending on the character of the associated circuits, the voltage gain, and the value of f_1 , it may be necessary to increase the value of C_k to minimize hum disturbances. It may be desirable to operate the heater at a positive voltage of from 15 to 40 volts with respect to the cathode. The voltage output at f_1 for "n" like stages equals $(0.7)^n E_o$ where E_o is the peak output voltage of the final stage. For an amplifier of typical construction, and for R_p values of 0.1, 0.25, and 0.5 megohm, approximate values of f_2 are 20000, 10000, and 5000 cps, respectively.

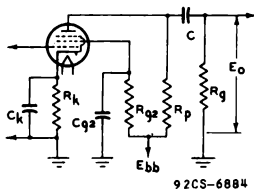


Diagram No. 3

Phase Inverters

Information given for triode amplifiers, in general, applies to this case. Capacitors C have been chosen to give an output voltage equal to $0.9 E_o$ for a frequency (f_1) of 100 cycles. For any other value of f_1 , multiply values of C by $100/f_1$. The signal input is applied to the grid of triode unit A. The grid of triode unit B obtains its signal from a tap (P) on the grid resistor (R_g) in the output circuit of unit A. The tap is chosen so as to make the voltage output of unit B equal to that of unit A. Its location is determined by the voltage gain values given in the charts. For



RESISTANCE-COUPLED AMPLIFIERS

(continued from preceding page)

example, if V.G. is 20 (from the charts), P is chosen so as to supply 1/20 of the voltage across R_g to the grid of unit B. For phase-inverter service, the cathode resistor may be left unbypassed unless a bypass capacitor is necessary to minimize hum; omission of the bypass capacitor assists in balancing the output stages. The value of R_k is specified on the basis that both units are operating simultaneously at the same values of plate load and plate voltage.

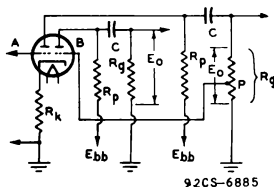


Diagram No. 4

SYMBOLS USED IN RESISTANCE-COUPLED AMPLIFIER CHARTS

- C = Blocking Capacitor (μf). V.G. = Voltage Gain. At 5 volts (RMS) output, unless otherwise specified.
- Ck = Cathode Bypass Capacitor (μf).
- Cg2 = Screen Bypass Capacitor (μf).
- E_{bb} = Plate-Supply Voltage (volts).
Voltage at plate equals plate-supply voltage minus drop in R_p and R_k . See Note 1, below.
- R_k = Cathode Resistor (ohms).
- R_{g2} = Screen Resistor (megohms).
- R_g = Grid Resistor (megohms).
for following stage.
- R_p = Plate Resistor (megohms).
- E_o = Peak Output Voltage (volts).
This voltage is obtained across R_g (for following stage) at any frequency within the flat region of the output vs frequency curve, and is for the condition where the signal level is adequate to swing the resistance-coupled amplifier tube to the point where its grid starts to draw current.

Note 1: For other supply voltages differing by as much as 50 per cent from those listed, the values of resistors, capacitors, and voltage gain are approximately correct. The value of voltage output, however, for any of these other supply voltages, equals the listed voltage output multiplied by the new plate-supply voltage divided by the plate-supply voltage corresponding to the listed voltage output.

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KEY TO RESISTANCE-COUPLED AMPLIFIER CHARTS

<u>Tube Type</u>	<u>Chart No.</u>	<u>Tube Type</u>	<u>Chart No.</u>	<u>Tube Type</u>	<u>Chart No.</u>
1L4	1	6Q7-G	7	12AY7 ##.	28
1S5	2	6Q7-GT	7	12C8	5
1U4	3	6R7	9	12F5-GT	18
1U5	2	6R7-GT	9	12J5-GT	13
2B7	5	6S7	16	12J7-GT {t.	11
6A6 #	6	6S7-G	16	{p.	14
6AQ6	7	6S8-GT	4	12Q7-GT	7
6AQ7-GT	7	6SC7 #	17	12S8-GT	4
6AT6	7	6SF5	18	12SC7 #	17
6AU6	8	6SF5-GT	18	12SF5	18
6AV6	25	6SF7	19	12SF7	19
6B7	5	6SH7	8	12SH7	8
6B8	5	6SJ7	20	12SJ7	20
6BF6	9	6SJ7-GT	20	12SJ7-GT	20
6C4	10	6SL7-GT ##	7	12SL7-GT ##	7
6C5	11	6SN7-GT ##	13	12SN7-GT ##	13
6C5-GT	11	6SN7-GTA ##	29	12SQ7	4
6C6 {t.	11	6SQ7	4	12SQ7-GT	4
{p.	14	6SQ7-GT	4	12SR7	9
6C8-G ##	12	6SR7	9	19T8	7
6F5	18	6ST7	9	53 #	6
6F5-GT	18	6SZ7	7	55	22
6F8-G ##	13	6T8	7	56	23
6J5	13	6W7-G {t.	11	57 {t.	11
6J5-GT	13	{p.	14	{p.	14
6J7	{t.	12AT6	7	75	4
6J7-G		12AU6	8	76	23
6J7-GT		12AV6	25	85	22
6N7 #	6	12AU7 ##.	10	5879 {t.	27
6N7-GT #	6	12AX7 ##.	25	{p.	26
6Q7	7				

The cathodes of the two units have a common terminal.

Chart values are for one triode unit. The cathodes of each unit have separate terminals.

t - Triode Connection

p - Pentode Connection



RESISTANCE-COUPLED AMPLIFIER CHARTS

See Circuit Diagram 2									1
E _{bb}	R _p	R _g	R _{g2}	R _k	C _{g2}	C _k	C	E _o	V.G.
45	0.22	0.22	0.24	—	0.071	—	0.011	12	16★
		0.47	0.32	—	0.06	—	0.006	14	23
		1.0	0.39	—	0.056	—	0.0035	18	30
	0.47	0.47	0.57	—	0.049	—	0.0052	14	22
		1.0	0.64	—	0.047	—	0.0035	17	30
		2.2	0.74	—	0.044	—	0.0018	19	33
	1.0	1.0	1.1	—	0.036	—	0.0028	14	28
		2.2	1.25	—	0.035	—	0.0018	16	32
		3.3	1.45	—	0.032	—	0.0015	18	38
90	0.22	0.22	0.4	—	0.089	—	0.011	26	28
		0.47	0.46	—	0.081	—	0.0055	36	36
		1.0	0.47	—	0.08	—	0.0035	42	41
	0.47	0.47	0.84	—	0.07	—	0.0055	30	34
		1.0	0.9	—	0.069	—	0.003	38	42
		2.2	1.0	—	0.062	—	0.0018	40	50
	1.0	1.0	2.0	—	0.045	—	0.0028	30	45
		2.2	2.1	—	0.045	—	0.0018	35	55
		3.3	2.2	—	0.044	—	0.0012	40	61
135	0.22	0.22	0.5	—	0.09	—	0.011	42	34
		0.47	0.63	—	0.074	—	0.0055	54	51
		1.0	0.67	—	0.072	—	0.0035	57	60
	0.47	0.47	1.1	—	0.071	—	0.005	47	49
		1.0	1.4	—	0.06	—	0.0028	54	68
		2.2	1.5	—	0.051	—	0.0018	60	87
	1.0	1.0	2.1	—	0.059	—	0.0025	45	53
		2.2	2.4	—	0.054	—	0.0018	57	88
		3.3	2.7	—	0.049	—	0.0012	61	91

★ At 4 volts (RMS) output.



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

2 See Circuit Diagram 2									
Ebb	R _p	R _g	R _{g2}	R _k	C _{g2}	C _k	C	E _o	V.G.
45	0.22	0.22	0.26	—	0.042	—	0.013	14	17
		0.47	0.36	—	0.035	—	0.006	17	24
		1.0	0.4	—	0.034	—	0.004	18	28
	0.47	0.47	0.82	—	0.025	—	0.0055	14	25
		1.0	1.0	—	0.023	—	0.003	17	33
		2.2	1.1	—	0.022	—	0.002	18	38
	1.0	1.0	1.9	—	0.019	—	0.003	14	31
		2.2	2.0	—	0.019	—	0.002	17	38
		3.3	2.2	—	0.018	—	0.0015	18	43
90	0.22	0.22	0.5	—	0.05	—	0.011	31	25
		0.47	0.59	—	0.05	—	0.006	37	34
		1.0	0.67	—	0.042	—	0.003	40	41
	0.47	0.47	1.2	—	0.035	—	0.005	31	37
		1.0	1.4	—	0.034	—	0.003	36	47
		2.2	1.6	—	0.031	—	0.002	40	57
	1.0	1.0	2.5	—	0.026	—	0.003	31	45
		2.2	2.9	—	0.025	—	0.002	36	58
		3.3	3.1	—	0.024	—	0.0012	38	66
135	0.22	0.22	0.66	—	0.052	—	0.011	45	31
		0.47	0.71	—	0.051	—	0.006	56	41
		1.0	0.86	—	0.039	—	0.003	60	54
	0.47	0.47	1.45	—	0.042	—	0.005	46	44
		1.0	1.8	—	0.034	—	0.003	54	62
		2.2	1.9	—	0.033	—	0.002	60	71
	1.0	1.0	3.1	—	0.03	—	0.003	45	56
		2.2	3.7	—	0.029	—	0.0015	53	76
		3.3	4.3	—	0.026	—	0.0014	56	88



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 2									3
E _{bb}	R _p	R _g	R _{g2}	R _k	C _{g2}	C _k	C	E _o	V.G.
45	0.22	0.22	0.06	—	0.046	—	0.011	11	23
		0.47	0.07	—	0.045	—	0.006	15	33
		1.0	0.011	—	0.04	—	0.003	17	39
	0.47	0.47	0.34	—	0.025	—	0.005	13	34
		1.0	0.44	—	0.022	—	0.003	16	46
		2.2	0.5	—	0.022	—	0.002	18	55
	1.0	1.0	1.0	—	0.016	—	0.003	14	43
		2.2	1.0	—	0.016	—	0.002	17	51
		3.3	1.1	—	0.015	—	0.001	17	60
90	0.22	0.22	0.3	—	0.046	—	0.01	27	37
		0.47	0.36	—	0.04	—	0.006	36	54
		1.0	0.4	—	0.038	—	0.003	39	63
	0.47	0.47	0.9	—	0.027	—	0.0045	29	61
		1.0	1.0	—	0.023	—	0.003	35	82
		2.2	1.1	—	0.022	—	0.002	38	96
	1.0	1.0	1.9	—	0.02	—	0.0025	30	77
		2.2	2.0	—	0.02	—	0.002	35	98
		3.3	2.2	—	0.018	—	0.001	37	114
135	0.22	0.22	0.4	—	0.052	—	0.011	44	46
		0.47	0.49	—	0.037	—	0.005	55	71
		1.0	0.52	—	0.034	—	0.003	60	83
	0.47	0.47	1.1	—	0.029	—	0.0045	45	77
		1.0	1.3	—	0.023	—	0.003	53	106
		2.2	1.4	—	0.022	—	0.002	59	123
	1.0	1.0	2.3	—	0.021	—	0.0025	45	104
		2.2	2.5	—	0.019	—	0.0015	53	136
		3.3	2.9	—	0.016	—	0.001	56	163



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

4 See Circuit Diagram 1									
E _{bb}	R _p	R _g	R _{g2}	R _k	C _{g2}	C _k	C	E _o	V.G.
90	0.1	0.1	-	6300	-	2.2	0.02	3	23●
		0.25	-	6600	-	1.7	0.01	5	29■
		0.5	-	6700	-	1.7	0.006	6	31★
	0.25	0.25	-	10000	-	1.24	0.01	5	34■
		0.5	-	11000	-	1.07	0.006	7	40★
		1.0	-	11500	-	0.9	0.003	10	40
	0.5	0.5	-	16200	-	0.75	0.005	7	39
		1.0	-	16600	-	0.7	0.003	10	44
		2.0	-	17400	-	0.65	0.0015	13	48
180	0.1	0.1	-	2600	-	3.3	0.025	16	29
		0.25	-	2900	-	2.9	0.015	22	36
		0.5	-	3000	-	2.7	0.007	23	37
	0.25	0.25	-	4300	-	2.1	0.015	21	43
		0.5	-	4800	-	1.8	0.007	28	50
		1.0	-	5300	-	1.5	0.004	33	53
	0.5	0.5	-	7000	-	1.3	0.007	25	52
		1.0	-	8000	-	1.1	0.004	33	57
		2.0	-	8800	-	0.9	0.002	38	58
300	0.1	0.1	-	1900	-	4.0	0.03	31	31
		0.25	-	2200	-	3.5	0.015	41	39
		0.5	-	2300	-	3.0	0.007	45	42
	0.25	0.25	-	3300	-	2.7	0.015	42	48
		0.5	-	3900	-	2.0	0.007	51	53
		1.0	-	4200	-	1.8	0.004	60	56
	0.5	0.5	-	5300	-	1.6	0.007	47	58
		1.0	-	6100	-	1.3	0.004	62	60
		2.0	-	7000	-	1.2	0.002	67	63

● At 2 volts (RMS) output. ■ At 3 volts (RMS) output. ★ At 4 volts (RMS) output



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 3									5
E _{bb}	R _p	R _g	R _{g2}	R _k	C _{g2}	C _k	C	E _o	V.G.
90	0.1	0.1	0.37	2000	0.07	3.0	0.02	19	24
		0.25	0.5	2200	0.07	3.0	0.01	28	33
		0.5	0.6	2000	0.06	2.8	0.006	29	37
	0.25	0.25	1.18	3500	0.04	1.9	0.008	26	43
		0.5	1.1	3500	0.04	2.1	0.007	33	55
		1.0	1.35	3500	0.04	1.9	0.003	32	65
	0.5	0.5	2.6	5000	0.04	1.5	0.004	22	63
		1.0	2.8	6000	0.04	1.55	0.003	29	85
		2.0	2.9	6200	0.04	1.5	0.003	27	100
180	0.1	0.1	0.44	1000	0.08	4.4	0.02	30	30
		0.25	0.5	1200	0.08	4.4	0.015	52	41
		0.5	0.6	1200	0.07	4.0	0.008	53	46
	0.25	0.25	1.18	1900	0.05	2.7	0.01	39	55
		0.5	1.2	2100	0.06	3.2	0.007	55	69
		1.0	1.5	2200	0.05	3.0	0.003	53	83
	0.5	0.5	2.6	3300	0.04	2.1	0.005	47	81
		1.0	2.8	3500	0.04	2.0	0.003	55	115
		2.0	3.0	3500	0.04	2.2	0.002	53	116
300	0.1	0.1	0.5	950	0.09	4.6	0.025	60	36
		0.25	0.55	1100	0.09	5.0	0.015	89	47
		0.5	0.6	900	0.08	4.8	0.009	86	54
	0.25	0.25	1.2	1500	0.06	3.2	0.015	70	64
		0.5	1.2	1600	0.06	3.5	0.008	100	79
		1.0	1.5	1800	0.08	4.0	0.004	95	100
	0.5	0.5	2.7	2400	0.05	2.5	0.006	80	96
		1.0	2.9	2500	0.05	2.3	0.003	120	150
		2.0	3.4	2800	0.05	2.8	0.0025	90	145



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

6 See Circuit Diagram 4									
E _{bb}	R _p	R _g	R _{g2}	R _k	C _{g2}	C _k	C	E _o	V.G.
90	0.1	0.1	—	1900*	—	—	0.025	13	16
		0.25	—	2250*	—	—	0.01	19	19
		0.5	—	2500*	—	—	0.006	20	20
	0.25	0.25	—	4050*	—	—	0.01	16	20
		0.5	—	4950*	—	—	0.006	20	22
		1.0	—	5400*	—	—	0.003	24	23
	0.5	0.5	—	7000*	—	—	0.006	18	22
		1.0	—	8500*	—	—	0.003	23	23
		2.0	—	9650*	—	—	0.0015	26	23
180	0.1	0.1	—	1300*	—	—	0.03	35	19
		0.25	—	1700*	—	—	0.015	46	21
		0.5	—	1950*	—	—	0.007	50	22
	0.25	0.25	—	2950*	—	—	0.015	40	23
		0.5	—	3800*	—	—	0.007	50	24
		1.0	—	4300*	—	—	0.0035	57	24
	0.5	0.5	—	5250*	—	—	0.007	44	24
		1.0	—	6600*	—	—	0.0035	54	25
		2.0	—	7650*	—	—	0.002	61	25
300	0.1	0.1	—	1150*	—	—	0.03	60	20
		0.25	—	1500*	—	—	0.015	83	22
		0.5	—	1750*	—	—	0.007	86	23
	0.25	0.25	—	2650*	—	—	0.015	75	23
		0.5	—	3400*	—	—	0.0055	87	24
		1.0	—	4000*	—	—	0.003	100	24
	0.5	0.5	—	4850*	—	—	0.0055	76	23
		1.0	—	6100*	—	—	0.003	94	24
		2.0	—	7150*	—	—	0.0015	104	24

*Values shown are for phase-inverter service.



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 1									7
E _{bb}	R _p	R _g	R _{g2}	R _k	C _{g2}	C _k	C	E _o	V.G.
90	0.1	0.1	—	4200	—	2.5	0.025	5.4	22●
		0.22	—	4600	—	2.2	0.014	7.5	27●
		0.47	—	4800	—	2.0	0.0065	9.1	30●
	0.22	0.22	—	7000	—	1.5	0.013	7.3	30●
		0.47	—	7800	—	1.3	0.007	10	34■
		1.0	—	8100	—	1.1	0.0035	12	37★
	0.47	0.47	—	12000	—	0.83	0.006	10	36■
		1.0	—	14000	—	0.7	0.0035	14	39★
		2.2	—	15000	—	0.6	0.002	16	41★
180	0.1	0.1	—	1900	—	3.6	0.027	19	30★
		0.22	—	2200	—	3.1	0.014	25	35
		0.47	—	2500	—	2.8	0.0065	32	37
	0.22	0.22	—	3400	—	2.2	0.014	24	38
		0.47	—	4100	—	1.7	0.0065	34	42
		1.0	—	4600	—	1.5	0.0035	38	44
	0.47	0.47	—	6600	—	1.1	0.0065	29	44
		1.0	—	8100	—	0.9	0.0035	38	46
		2.2	—	9100	—	0.8	0.002	43	47
300	0.1	0.1	—	1500	—	4.4	0.027	40	34
		0.22	—	1800	—	3.6	0.014	54	38
		0.47	—	2100	—	3.0	0.0065	63	41
	0.22	0.22	—	2600	—	2.5	0.013	51	42
		0.47	—	3200	—	1.9	0.0065	65	46
		0.1	—	3700	—	1.6	0.0035	77	48
	0.47	0.47	—	5200	—	1.2	0.006	61	48
		1.0	—	6300	—	1.0	0.0035	74	50
		2.2	—	7200	—	0.9	0.002	85	51

● At 2 volts (RMS) output. ■ At 3 volts (RMS) output. ★ At 4 volts (RMS) output



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

8 See Circuit Diagram 3									
Ebb	R _p	R _g	R _{g2}	R _k	C _{g2}	C _k	C	E _o	V.G.
90	0.1	0.1	0.07	1800	0.11	9.0	0.021	25	52
		0.22	0.09	2100	0.1	8.2	0.012	32	72
		0.47	0.096	2100	0.1	8.0	0.0065	37	88
	0.22	0.22	0.25	3100	0.08	6.2	0.009	25	72
		0.47	0.26	3200	0.078	5.8	0.0055	32	99
		1.0	0.35	3700	0.085	5.1	0.003	34	125
	0.47	0.47	0.75	6300	0.042	3.4	0.0035	27	102
		1.0	0.75	6500	0.042	3.3	0.0027	32	126
		2.2	0.8	6700	0.04	3.2	0.0018	36	152
180	0.1	0.1	0.12	800	0.15	14.1	0.021	57	74
		0.22	0.15	900	0.126	14.0	0.012	82	116
		0.47	0.19	1000	0.1	12.5	0.006	81	141
	0.22	0.22	0.38	1500	0.09	9.6	0.009	59	130
		0.47	0.43	1700	0.08	8.7	0.005	67	171
		1.0	0.6	1900	0.066	8.1	0.003	71	200
	0.47	0.47	0.9	3100	0.06	5.7	0.0045	54	172
		1.0	1.0	3400	0.05	5.4	0.0028	65	232
		2.2	1.1	3600	0.04	3.6	0.0019	74	272
300	0.1	0.1	0.2	500	0.13	18.0	0.019	76	109
		0.22	0.24	600	0.11	16.4	0.011	103	145
		0.47	0.26	700	0.11	15.3	0.006	129	168
	0.22	0.22	0.42	1000	0.1	12.4	0.009	92	164
		0.47	0.5	1000	0.098	12.0	0.007	108	230
		1.0	0.55	1100	0.09	11.0	0.003	122	262
	0.47	0.47	1.0	1800	0.075	8.0	0.0045	94	248
		1.0	1.1	1900	0.065	7.6	0.0028	105	318
		2.2	1.2	2100	0.06	7.3	0.0018	122	371



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 1									9
E _{bb}	R _p	R _g	R _{g2}	R _k	C _{g2}	C _k	C	E _o	V.G.
90	0.047	0.047	-	2200	-	2.5	0.063	14	9
		0.1	-	2800	-	2.0	0.033	18	10
		0.22	-	3200	-	1.7	0.015	20	10
	0.1	0.1	-	4100	-	1.4	0.032	13	10
		0.22	-	5400	-	1.0	0.013	20	11
		0.47	-	6400	-	0.9	0.007	24	11
	0.22	0.22	-	8500	-	0.67	0.015	18	11
		0.47	-	12000	-	0.5	0.0065	23	11
		1.0	-	14000	-	0.43	0.0035	27	11
180	0.047	0.047	-	2000	-	2.9	0.062	32	10
		0.1	-	2500	-	2.2	0.033	42	10
		0.22	-	3000	-	1.9	0.016	47	11
	0.1	0.1	-	3800	-	1.5	0.033	36	11
		0.22	-	5100	-	1.1	0.015	47	11
		0.47	-	6200	-	0.9	0.007	55	12
	0.22	0.22	-	8000	-	0.73	0.015	41	12
		0.47	-	11000	-	0.5	0.007	54	12
		1.0	-	13000	-	0.4	0.0035	69	12
300	0.047	0.047	-	1800	-	3.0	0.063	58	10
		0.1	-	2400	-	2.4	0.033	74	11
		0.22	-	2900	-	2.0	0.016	85	11
	0.1	0.1	-	3600	-	1.6	0.033	65	12
		0.22	-	5000	-	1.2	0.015	85	12
		0.47	-	6200	-	0.95	0.007	96	12
	0.22	0.22	-	7800	-	0.73	0.015	74	12
		0.47	-	11000	-	0.5	0.007	95	12
		1.0	-	13000	-	0.43	0.0035	106	12



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

10 See Circuit Diagram 1									
E _{bb}	R _p	R _g	R _{g2}	R _k	C _{g2}	C _k	C	E _o	V.G.
90	0.047	0.047	—	1600	—	3.2	0.061	9	10 [■]
		0.1	—	1800	—	2.5	0.033	11	11★
		0.22	—	2000	—	2.0	0.015	14	11
	0.1	0.1	—	3000	—	1.6	0.032	10	11★
		0.22	—	3800	—	1.1	0.015	15	11
		0.47	—	4500	—	1.0	0.007	18	11
	0.22	0.22	—	6800	—	0.7	0.015	14	11
		0.47	—	9500	—	0.5	0.0065	20	11
		1.0	—	11500	—	0.43	0.0035	24	11
180	0.047	0.047	—	920	—	3.9	0.062	20	11
		0.1	—	1200	—	2.9	0.037	26	12
		0.22	—	1400	—	2.5	0.016	29	12
	0.1	0.1	—	2000	—	1.9	0.032	24	12
		0.22	—	2800	—	1.4	0.016	33	12
		0.47	—	3600	—	1.1	0.007	40	12
	0.22	0.22	—	5300	—	0.8	0.015	31	12
		0.47	—	8300	—	0.56	0.007	44	12
		1.0	—	10000	—	0.48	0.0035	54	12
300	0.047	0.047	—	870	—	4.1	0.065	38	12
		0.1	—	1200	—	3.0	0.034	52	12
		0.22	—	1500	—	2.4	0.016	68	12
	0.1	0.1	—	1900	—	1.9	0.032	44	12
		0.22	—	3000	—	1.3	0.016	68	12
		0.47	—	4000	—	1.1	0.007	80	12
	0.22	0.22	—	5300	—	0.9	0.015	57	12
		0.47	—	8800	—	0.52	0.007	82	12
		1.0	—	11000	—	0.46	0.0035	92	12

■ At 3 volts (RMS) output. ★ At 4 volts (RMS) output.



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 1									11
Ebb	R _p	R _g	R _{g2}	R _k	C _{g2}	C _k	C	E _o	V.G.
90	0.05	0.05	—	2800	—	2.0	0.05	14	9
		0.1	—	3400	—	1.62	0.025	17	9
		0.25	—	3800	—	1.3	0.01	20	10
	0.1	0.1	—	4800	—	1.12	0.025	16	10
		0.25	—	6400	—	0.84	0.01	22	11
		0.5	—	7500	—	0.66	0.005	23	12
	0.25	0.25	—	11400	—	0.52	0.01	18	12
		0.5	—	14500	—	0.4	0.006	23	12
		1.0	—	17300	—	0.33	0.004	26	13
180	0.05	0.05	—	2200	—	2.2	0.055	34	10
		0.1	—	2700	—	2.1	0.03	45	11
		0.25	—	3100	—	1.85	0.015	54	11
	0.1	0.1	—	3900	—	1.7	0.035	41	12
		0.25	—	5300	—	1.25	0.015	54	12
		0.5	—	6200	—	1.2	0.008	55	13
	0.25	0.25	—	9500	—	0.74	0.015	44	13
		0.5	—	12300	—	0.55	0.008	52	13
		1.0	—	14700	—	0.47	0.004	59	13
300	0.05	0.05	—	2100	—	3.16	0.075	57	11
		0.1	—	2600	—	2.3	0.04	70	11
		0.25	—	3100	—	2.2	0.015	83	12
	0.1	0.1	—	3800	—	1.7	0.035	65	12
		0.25	—	5300	—	1.3	0.015	84	13
		0.5	—	6000	—	1.17	0.008	88	13
	0.25	0.25	—	9600	—	0.9	0.015	73	13
		0.5	—	12300	—	0.59	0.008	85	14
		1.0	—	14000	—	0.37	0.003	97	14



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

12 See Circuit Diagram 1									
Ebb	R _p	R _g	R _{g2}	R _k	C _{g2}	C _k	C	E _o	V.G.
90	0.1	0.1	-	3040	-	2.34	0.028	13	18
		0.25	-	3700	-	1.48	0.0115	17	20
		0.5	-	4520	-	1.29	0.006	19	21
	0.25	0.25	-	6770	-	0.95	0.011	15	21
		0.5	-	7870	-	0.81	0.0065	19	23
		1.0	-	8830	-	0.69	0.0035	21	23
	0.5	0.5	-	12400	-	0.51	0.006	16	22
		1.0	-	15000	-	0.43	0.0035	20	24
		2.0	-	16500	-	0.38	0.0015	25	24
180	0.1	0.1	-	2420	-	2.34	0.028	30	20
		0.25	-	3080	-	1.84	0.012	40	22
		0.5	-	3560	-	1.6	0.0065	45	23
	0.25	0.25	-	5170	-	1.25	0.012	35	24
		0.5	-	6560	-	0.95	0.007	45	25
		1.0	-	7550	-	0.85	0.0035	50	26
	0.5	0.5	-	9840	-	0.66	0.007	38	25
		1.0	-	12500	-	0.5	0.004	44	26
		2.0	-	15600	-	0.44	0.0015	51	26
300	0.1	0.1	-	2120	-	3.93	0.037	55	22
		0.25	-	2840	-	2.01	0.013	73	23
		0.5	-	3250	-	1.79	0.007	80	25
	0.25	0.25	-	4750	-	1.29	0.013	64	25
		0.5	-	6100	-	0.96	0.0065	80	26
		1.0	-	7100	-	0.77	0.004	90	27
	0.5	0.5	-	9000	-	0.67	0.007	67	27
		1.0	-	11500	-	0.48	0.004	83	27
		2.0	-	14500	-	0.37	0.002	96	28



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 1									13
E _{bb}	R _p	R _g	R _{g2}	R _k	C _{g2}	C _k	C	E _o	V.G.
90	0.05	0.05	-	1650	-	2.80	0.06	11	11
		0.1	-	2070	-	2.66	0.029	14	12
		0.25	-	2380	-	1.95	0.012	17	13
	0.1	0.1	-	3470	-	1.85	0.035	12	13
		0.25	-	3940	-	1.29	0.012	17	13
		0.5	-	4420	-	1.0	0.007	19	13
	0.25	0.25	-	7860	-	0.73	0.0135	14	13
		0.5	-	9760	-	0.55	0.007	18	13
		1.0	-	10690	-	0.47	0.004	20	13
180	0.05	0.05	-	1190	-	3.27	0.06	24	13
		0.1	-	1490	-	2.86	0.032	30	13
		0.25	-	1740	-	2.06	0.0115	36	13
	0.1	0.1	-	2330	-	2.19	0.038	26	14
		0.25	-	2830	-	1.35	0.012	34	14
		0.5	-	3230	-	1.15	0.006	38	14
	0.25	0.25	-	5560	-	0.81	0.013	28	14
		0.5	-	7000	-	0.62	0.007	36	14
		1.0	-	8110	-	0.5	0.004	40	14
300	0.05	0.05	-	1020	-	3.56	0.06	41	13
		0.1	-	1270	-	2.96	0.034	51	14
		0.25	-	1500	-	2.15	0.012	60	14
	0.1	0.1	-	1900	-	2.31	0.035	43	14
		0.25	-	2440	-	1.42	0.0125	56	14
		0.5	-	2700	-	1.2	0.0065	64	14
	0.25	0.25	-	4590	-	0.87	0.013	46	14
		0.5	-	5770	-	0.64	0.0075	57	14
		1.0	-	6950	-	0.54	0.004	64	14



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

14 See Circuit Diagram 3									
E_{pb}	R_p	R_g	R_{g2}	R_k	C_{g2}	C_k	C	E_o	V.G.
90	0.1	0.1	0.37	1200	0.05	5.2	0.02	17	41
		0.25	0.44	1100	0.05	5.3	0.01	22	55
		0.5	0.44	1300	0.05	4.8	0.006	33	66
	0.25	0.25	1.1	2400	0.03	3.7	0.008	23	70
		0.5	1.18	2600	0.03	3.2	0.005	32	85
		1.0	1.4	3600	0.025	2.5	0.003	33	92
	0.5	0.5	2.18	4700	0.02	2.3	0.005	28	93
		1.0	2.6	5500	0.05	2.0	0.0025	29	120
		2.0	2.7	5500	0.02	2.0	0.0015	27	140
180	0.1	0.1	0.44	1000	0.05	6.5	0.02	42	51
		0.25	0.5	750	0.05	6.7	0.01	52	69
		0.5	0.5	800	0.05	6.7	0.006	59	83
	0.25	0.25	1.1	1200	0.04	5.2	0.008	41	93
		0.5	1.18	1600	0.04	4.3	0.005	60	118
		1.0	1.4	2000	0.04	3.8	0.0035	60	140
	0.5	0.5	2.45	2600	0.03	3.2	0.005	45	135
		1.0	2.9	3100	0.025	2.5	0.0025	56	165
		2.0	2.7	3500	0.02	2.8	0.0015	60	165
300	0.1	0.1	0.44	500	0.07	8.5	0.02	55	61
		0.25	0.5	450	0.07	8.3	0.01	81	82
		0.5	0.53	600	0.06	8.0	0.006	96	94
	0.25	0.25	1.18	1100	0.04	5.5	0.008	81	104
		0.5	1.18	1200	0.04	5.4	0.005	104	140
		1.0	1.45	1300	0.05	5.8	0.005	110	185
	0.5	0.5	2.45	1700	0.04	4.2	0.005	75	161
		1.0	2.9	2200	0.04	4.1	0.003	97	200
		2.0	2.95	2300	0.04	4.0	0.0025	100	230



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 1									15
E _{bb}	R _p	R _g	R _{g2}	R _k	C _{g2}	C _k	C	E _o	V.G.*
90	0.05	0.05	-	2120	-	2.3	0.05	14	9.3
		0.1	-	2500	-	1.86	0.03	18	10
		0.25	-	2900	-	1.65	0.014	21	11
	0.1	0.1	-	3510	-	1.36	0.03	16	11
		0.25	-	4620	-	1.08	0.015	22	12
		0.5	-	5200	-	1.0	0.0085	23	12
	0.25	0.25	-	8050	-	0.61	0.0125	18	12
		0.5	-	10300	-	0.49	0.0085	22	12
		1.0	-	12100	-	0.42	0.0055	24	12
180	0.05	0.05	-	1810	-	2.9	0.06	32	10
		0.1	-	2240	-	2.2	0.03	41	11
		0.25	-	2660	-	1.8	0.014	46	12
	0.1	0.1	-	3180	-	1.46	0.03	36	12
		0.25	-	4200	-	1.1	0.0145	46	12
		0.5	-	4790	-	1.0	0.009	50	12
	0.25	0.25	-	7100	-	0.7	0.014	38	12
		0.5	-	9290	-	0.54	0.009	46	12
		1.0	-	10950	-	0.46	0.0055	52	13
300	0.05	0.05	-	1740	-	2.91	0.06	56	11
		0.1	-	2160	-	2.18	0.032	68	12
		0.25	-	2600	-	1.82	0.015	79	12
	0.1	0.1	-	3070	-	1.64	0.032	60	12
		0.25	-	4140	-	1.1	0.014	79	13
		0.5	-	4700	-	0.81	0.0075	89	13
	0.25	0.25	-	6900	-	0.57	0.013	64	13
		0.5	-	9100	-	0.46	0.0075	80	13
		1.0	-	10750	-	0.4	0.005	88	13

★ At 4 volts (RMS) output.



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

16 See Circuit Diagram 3									
E _{bb}	R _p	R _g	R _{g2}	R _k	C _{g2}	C _k	C	E _o	V.G.
90	0.1	0.1	0.59	870	0.065	5.1	0.018	16	33
		0.25	0.65	900	0.061	5.0	0.01	21	47
		0.5	0.7	910	0.057	4.58	0.007	23	54
	0.25	0.25	1.5	1440	0.044	3.38	0.007	14	56
		0.5	1.6	1520	0.044	3.23	0.0055	18	66
		1.0	1.7	1560	0.043	3.22	0.004	19	77
	0.5	0.5	3.2	2620	0.029	2.04	0.004	12	70
		1.0	3.5	2800	0.03	1.95	0.0026	15	84
		2.0	3.7	3000	0.031	1.92	0.0024	16	94
180	0.1	0.1	0.58	530	0.073	7.2	0.017	33	47
		0.25	0.68	540	0.07	6.9	0.01	43	66
		0.5	0.71	540	0.065	6.6	0.0063	48	75
	0.25	0.25	1.6	850	0.05	4.6	0.0071	33	79
		0.5	1.8	890	0.044	4.7	0.005	40	104
		1.0	1.9	950	0.046	4.4	0.0037	44	118
	0.5	0.5	3.3	1410	0.041	3.5	0.0041	30	109
		1.0	3.6	1520	0.037	3.0	0.003	38	134
		2.0	3.8	1600	0.031	2.9	0.0024	42	147
300	0.1	0.1	0.59	430	0.007	8.5	0.0167	57	57
		0.25	0.67	440	0.071	8.0	0.01	75	78
		0.5	0.71	440	0.071	8.0	0.0066	82	89
	0.25	0.25	1.7	620	0.058	6.0	0.0071	54	98
		0.5	1.95	650	0.057	5.8	0.005	66	122
		1.0	2.1	700	0.055	5.2	0.0036	76	136
	0.5	0.5	3.6	1000	0.04	4.1	0.0037	52	136
		1.0	3.9	1080	0.041	3.9	0.0029	66	162
		2.0	4.1	1120	0.043	3.8	0.0023	73	174



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 4									17
E _{bb}	R _p	R _g	R _{g2}	R _k	C _{g2}	C _k	C	E _o	V.G.
90	0.1	0.1	—	1850*	—	—	0.028	4.1	13◆
		0.25	—	1960*	—	—	0.012	5.9	23■
		0.5	—	2050*	—	—	0.0065	6.9	25★
	0.25	0.25	—	3400*	—	—	0.011	6.2	26★
		0.5	—	3750*	—	—	0.006	8.6	30
		1.0	—	3900*	—	—	0.003	10	33
	0.5	0.5	—	5500*	—	—	0.005	7.4	31
		1.0	—	6300*	—	—	0.003	10	33
		2.0	—	7450*	—	—	0.0015	12	36
180	0.1	0.1	—	960*	—	—	0.031	17	25
		0.25	—	1070*	—	—	0.012	24	29
		0.5	—	1220*	—	—	0.0065	27	33
	0.25	0.25	—	1850*	—	—	0.011	21	35
		0.5	—	2150*	—	—	0.006	28	39
		1.0	—	2400*	—	—	0.003	32	41
	0.5	0.5	—	3050*	—	—	0.006	24	40
		1.0	—	3420*	—	—	0.003	32	43
		2.0	—	3890*	—	—	0.002	36	45
300	0.1	0.1	—	750*	—	—	0.033	35	29
		0.25	—	930*	—	—	0.014	50	34
		0.25	—	1040*	—	—	0.007	54	36
	0.25	0.25	—	1400*	—	—	0.012	45	39
		0.5	—	1680*	—	—	0.006	55	42
		1.0	—	1840*	—	—	0.003	64	45
	0.5	0.5	—	2330*	—	—	0.006	50	45
		1.0	—	2980*	—	—	0.003	62	48
		2.0	—	3280*	—	—	0.002	72	49

◆ At 2 volts (RMS) output. ■ At 3 volts (RMS) output. ★ At 4 volts (RMS) output.

*Values are for phase-inverter service.



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

18 See Circuit Diagram 1									
Ebb	R _p	R _g	R _{g2}	R _k	C _{g2}	C _k	C	E _o	V.G.
90	0.1	0.1	-	4400	-	2.5	0.02	4	28●
		0.25	-	4800	-	2.1	0.01	5	34■
		0.5	-	5000	-	1.8	0.005	6	35★
	0.25	0.25	-	8000	-	1.33	0.01	6	39■
		0.5	-	8800	-	1.18	0.005	7	43★
		1.0	-	9000	-	0.9	0.003	10	44
	0.5	0.5	-	12200	-	0.76	0.005	8	43
		1.0	-	13500	-	0.67	0.003	10	46
		2.0	-	14700	-	0.58	0.0015	12	48
180	0.1	0.1	-	1800	-	4.4	0.025	16	37
		0.25	-	2000	-	3.3	0.015	23	44
		0.5	-	2200	-	2.9	0.006	25	46
	0.25	0.25	-	3500	-	2.3	0.01	21	48
		0.5	-	4100	-	1.8	0.006	26	53
		1.0	-	4500	-	1.7	0.004	32	57
	0.5	0.5	-	6100	-	1.3	0.006	24	53
		1.0	-	6900	-	0.9	0.003	33	63
		2.0	-	7700	-	0.83	0.0015	37	66
300	0.1	0.1	-	1300	-	5.0	0.025	33	42
		0.25	-	1600	-	3.7	0.01	43	49
		0.5	-	1700	-	3.2	0.006	48	52
	0.25	0.25	-	2600	-	2.5	0.01	41	56
		0.5	-	3200	-	2.1	0.007	54	63
		1.0	-	3500	-	2.0	0.004	63	67
	0.5	0.5	-	4500	-	1.5	0.006	50	65
		1.0	-	5400	-	1.2	0.004	62	70
		2.0	-	6100	-	0.93	0.002	70	70

● At 2 volts (RMS) output. ■ At 3 volts (RMS) output. ★ At 4 volts (RMS) output



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 3									19
E _{bb}	R _p	R _g	R _{g2}	R _k	C _{g2}	C _k	C	E _o	V.G.
90	0.1	0.1	0.26	1500	0.11	4.8	0.02	21	21
		0.22	0.3	1600	0.1	4.4	0.012	26	29
		0.47	0.35	1900	0.09	4.2	0.006	28	37
	0.22	0.22	0.64	2400	0.09	3.4	0.009	21	33
		0.47	0.7	2500	0.09	3.2	0.0055	26	40
		1.0	0.84	2600	0.084	3.0	0.0035	29	52
	0.47	0.47	1.5	4200	0.06	2.1	0.0045	21	50
		1.0	1.6	4400	0.06	1.9	0.003	26	59
		2.2	1.7	4800	0.058	1.6	0.002	29	64
180	0.1	0.1	0.33	1000	0.13	6.7	0.02	32	33
		0.22	0.5	1200	0.12	5.8	0.011	37	45
		0.47	0.6	1300	0.11	5.5	0.006	43	52
	0.22	0.22	0.76	1700	0.11	4.5	0.0095	37	47
		0.47	0.9	1700	0.1	4.5	0.0055	44	68
		1.0	1.0	1800	0.1	4.2	0.003	47	82
	0.47	0.47	1.8	3300	0.09	2.9	0.0045	38	70
		1.0	2.0	3800	0.08	2.4	0.003	50	85
		2.2	2.1	4000	0.07	2.3	0.002	57	98
300	0.1	0.1	0.32	750	0.19	8.0	0.021	62	39
		0.22	0.36	850	0.18	7.7	0.012	80	46
		0.47	0.37	900	0.18	7.7	0.006	93	57
	0.22	0.22	0.8	1150	0.13	6	0.01	63	62
		0.47	0.94	1300	0.12	5.7	0.0055	78	88
		1.0	0.98	1500	0.11	5.0	0.0035	99	97
	0.47	0.47	1.7	2300	0.1	3.5	0.0045	71	82
		1.0	1.9	2500	0.1	3.5	0.003	89	109
		2.2	2.0	2800	0.09	3.1	0.002	105	125



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

20 See Circuit Diagram 3									
E _{bb}	R _p	R _g	R _{g2}	R _k	C _{g2}	C _k	C	E _o	V.G.
90	0.1	0.1	0.29	820	0.09	8.8	0.02	18	41
		0.25	0.29	880	0.085	7.4	0.016	23	68
		0.5	0.31	1000	0.075	6.6	0.007	28	70
	0.25	0.25	0.69	1680	0.06	5.0	0.012	16	75
		0.5	0.92	1700	0.045	4.5	0.005	18	93
		1.0	0.82	1800	0.04	4.0	0.003	22	104
	0.5	0.5	1.5	3600	0.045	2.4	0.003	18	91
		1.0	1.7	3800	0.03	2.4	0.002	22	119
		2.0	1.9	4050	0.028	2.35	0.0015	24	139
180	0.1	0.1	0.29	760	0.10	9.1	0.019	49	55
		0.25	0.31	800	0.09	8.0	0.015	60	82
		0.5	0.37	860	0.09	7.8	0.007	62	91
	0.25	0.25	0.83	1050	0.06	6.8	0.001	38	109
		0.5	0.94	1060	0.06	6.6	0.004	47	131
		1.0	0.94	1100	0.07	6.1	0.003	54	161
	0.5	0.5	1.85	2000	0.05	4.0	0.003	37	151
		1.0	2.2	2180	0.04	3.8	0.002	44	192
		2.0	2.4	2410	0.035	3.6	0.0015	54	208
300	0.1	0.1	0.35	500	0.10	11.6	0.019	72	67
		0.25	0.37	530	0.09	10.9	0.016	96	98
		0.5	0.47	590	0.09	9.9	0.007	101	104
	0.25	0.25	0.89	850	0.07	8.5	0.011	79	139
		0.5	1.10	860	0.06	7.4	0.004	88	167
		1.0	1.18	910	0.06	6.9	0.003	98	185
	0.5	0.5	2.0	1300	0.06	6.0	0.004	64	200
		1.0	2.2	1410	0.05	5.8	0.002	79	238
		2.0	2.5	1530	0.04	5.2	0.0015	89	263



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 4									21
Ebb	R _p	R _g	R _{g2}	R _k	C _{g2}	C _k	C	E _o	V.G.
90	0.1	0.1	—	1480*	—	2.65	0.025	8	21★
		0.25	—	1760*	—	2.02	0.0115	11	25
		0.5	—	1930*	—	1.7	0.0065	14	26
	0.25	0.25	—	3000*	—	1.36	0.01	12	28
		0.5	—	3390*	—	1.1	0.006	15	30
		1.0	—	3670*	—	0.8	0.0035	18	33
	0.5	0.5	—	5300*	—	0.65	0.0055	14	31
		1.0	—	6050*	—	0.61	0.003	18	33
		2.0	—	6700*	—	0.45	0.0015	20	35
180	0.1	0.1	—	930*	—	3.4	0.028	18	26
		0.25	—	1100*	—	2.6	0.0115	28	31
		0.5	—	1210*	—	2.32	0.007	33	32
	0.25	0.25	—	1820*	—	1.71	0.012	28	35
		0.5	—	2110*	—	1.38	0.007	34	38
		1.0	—	2400*	—	1.1	0.0035	41	39
	0.5	0.5	—	3240*	—	0.9	0.006	32	39
		1.0	—	3890*	—	0.703	0.0035	38	40
		2.0	—	4360*	—	0.553	0.002	44	41
300	0.1	0.1	—	670*	—	3.81	0.028	38	31
		0.25	—	950*	—	2.63	0.012	52	34
		0.5	—	1050*	—	2.34	0.007	60	36
	0.25	0.25	—	1430*	—	1.87	0.012	50	38
		0.5	—	1680*	—	1.46	0.006	59	40
		1.0	—	1930*	—	1.19	0.0035	66	43
	0.5	0.5	—	2540*	—	0.97	0.006	55	42
		1.0	—	3110*	—	0.72	0.0035	70	44
		2.0	—	3560*	—	0.56	0.002	75	45

★ At 4 volts (RMS) output. *Values are for phase-inverter service.



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

22 See Circuit Diagram 1									
E _{bb}	R _p	R _g	R _{g2}	R _k	C _{g2}	C _k	C	E _o	V.G.
90	0.05	0.05	—	3800	—	1.4	0.06	16	4.5
		0.1	—	4600	—	1.1	0.03	19	4.9
		0.25	—	5400	—	0.86	0.015	23	5.1
	0.1	0.1	—	6620	—	0.7	0.04	17	5.1
		0.25	—	9000	—	0.55	0.015	22	5.4
		0.5	—	10300	—	0.5	0.007	25	5.5
	0.25	0.25	—	15100	—	0.31	0.015	18	5.3
		0.5	—	20500	—	0.25	0.007	23	5.5
		1.0	—	24400	—	0.2	0.004	26	5.6
180	0.05	0.05	—	3200	—	1.8	0.06	33	4.9
		0.1	—	4100	—	1.6	0.045	44	5.2
		0.25	—	5000	—	1.2	0.02	49	5.3
	0.1	0.1	—	6200	—	0.9	0.04	37	5.3
		0.25	—	8700	—	0.7	0.015	47	5.5
		0.5	—	10000	—	0.57	0.008	50	5.5
	0.25	0.25	—	14500	—	0.43	0.015	40	5.6
		0.5	—	20000	—	0.29	0.008	48	5.7
		1.0	—	24000	—	0.24	0.004	53	5.7
300	0.05	0.05	—	3200	—	1.9	0.08	50	5.2
		0.1	—	4100	—	1.5	0.045	74	5.5
		0.25	—	5100	—	1.2	0.015	85	5.6
	0.1	0.1	—	5900	—	0.8	0.03	64	5.5
		0.25	—	8300	—	0.54	0.015	82	5.7
		0.5	—	9600	—	0.43	0.006	88	5.8
	0.25	0.25	—	14300	—	0.3	0.01	71	5.7
		0.5	—	19400	—	0.22	0.006	84	5.7
		1.0	—	23600	—	0.2	0.003	94	5.8



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 1									23
Ebb	R _p	R _g	R _{g2}	R _k	C _{g2}	C _k	C	E _o	V.G.
90	0.05	0.05	—	2500	—	2.0	0.06	16	7.0
		0.1	—	3200	—	1.6	0.03	21	7.7
		0.25	—	3800	—	1.25	0.015	23	8.1
	0.1	0.1	—	4500	—	1.05	0.03	19	8.1
		0.25	—	6500	—	0.82	0.015	23	8.9
		0.5	—	7500	—	0.68	0.007	25	9.3
	0.25	0.25	—	11100	—	0.48	0.015	21	9.4
		0.5	—	15100	—	0.36	0.007	24	9.7
		1.0	—	18300	—	0.32	0.0035	28	9.8
180	0.05	0.05	—	2400	—	2.5	0.06	36	7.7
		0.1	—	3000	—	1.9	0.035	48	8.2
		0.25	—	3700	—	1.65	0.015	55	9.0
	0.1	0.1	—	4500	—	1.45	0.035	45	9.3
		0.25	—	6500	—	0.97	0.015	55	9.5
		0.5	—	7600	—	0.8	0.008	57	9.8
	0.25	0.25	—	10700	—	0.6	0.015	49	9.7
		0.5	—	14700	—	0.45	0.007	59	10
		1.0	—	17700	—	0.4	0.0045	64	10
300	0.05	0.05	—	2400	—	2.8	0.08	65	8.3
		0.1	—	3100	—	2.2	0.045	80	8.9
		0.25	—	3800	—	1.8	0.02	95	9.4
	0.1	0.1	—	4500	—	1.6	0.04	74	9.5
		0.25	—	6400	—	1.2	0.02	95	10
		0.5	—	7500	—	0.98	0.009	104	10
	0.25	0.25	—	11100	—	0.69	0.02	82	10
		0.5	—	15200	—	0.5	0.009	96	10
		1.0	—	18300	—	0.4	0.005	108	10



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

24 See Circuit Diagram 4									
E _{bb}	R _p	R _g	R _{g2}	R _k	C _{g2}	C _k	C	E _o	V.G.
90	0.1	0.1	—	2050*	—	—	0.04	5.8	23■
		0.25	—	2200*	—	—	0.015	8.4	29★
		0.5	—	2350*	—	—	0.009	9.5	29
	0.25	0.25	—	4000*	—	—	0.015	7.1	31★
		0.5	—	4250*	—	—	0.006	9.7	33
		1.0	—	4650*	—	—	0.004	12	35
	0.5	0.5	—	6150*	—	—	0.006	8.8	34
		1.0	—	6850*	—	—	0.004	12	38
		2.0	—	7500*	—	—	0.002	15	40
180	0.1	0.1	—	1050*	—	—	0.04	21	27
		0.25	—	1250*	—	—	0.02	27	31
		0.5	—	1350*	—	—	0.009	31	34
	0.25	0.25	—	2050*	—	—	0.02	26	37
		0.5	—	2450*	—	—	0.01	34	41
		1.0	—	2750*	—	—	0.005	40	42
	0.5	0.5	—	3450*	—	—	0.009	30	42
		1.0	—	4100*	—	—	0.0035	39	44
		2.0	—	4650*	—	—	0.002	44	45
300	0.1	0.1	—	800*	—	—	0.025	40	29
		0.25	—	1000*	—	—	0.01	57	34
		0.5	—	1100*	—	—	0.006	60	36
	0.25	0.25	—	1650*	—	—	0.01	56	39
		0.5	—	2050*	—	—	0.0055	66	42
		1.0	—	2350*	—	—	0.003	77	43
	0.5	0.5	—	2850*	—	—	0.0055	61	44
		1.0	—	3600*	—	—	0.003	75	46
		2.0	—	4450*	—	—	0.0015	82	46

■ At 3 volts (RMS) output.

★ At 4 volts (RMS) output.

*Values are for phase-inverter service.



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 1									25
E _{bb}	R _p	R _g	R _{g2}	R _k	C _{g2}	C _k	C	E _o	V.G.
90	0.1	0.1	—	4400	—	2.7	0.023	5	29●
		0.22	—	4700	—	2.4	0.013	6	35●
		0.47	—	4800	—	2.3	0.007	8	41●
	0.22	0.22	—	7000	—	1.6	0.001	6	39●
		0.47	—	7400	—	1.4	0.006	9	45■
		1.0	—	7600	—	1.3	0.003	11	48★
	0.47	0.47	—	12000	—	0.9	0.006	9	48■
		1.0	—	13000	—	0.8	0.003	11	52★
		2.2	—	14000	—	0.7	0.002	13	55★
180	0.1	0.1	—	1800	—	4.0	0.025	18	40
		0.22	—	2000	—	3.5	0.013	25	47
		0.47	—	2200	—	3.1	0.006	32	52
	0.22	0.22	—	3000	—	2.4	0.012	24	53
		0.47	—	3500	—	2.1	0.006	34	59
		1.0	—	3900	—	1.8	0.003	39	63
	0.47	0.47	—	5800	—	1.3	0.006	30	62
		1.0	—	6700	—	1.1	0.003	39	66
		2.2	—	7400	—	1.0	0.002	45	68
300	0.1	0.1	—	1300	—	4.6	0.027	43	45
		0.22	—	1500	—	4.0	0.013	57	52
		0.47	—	1700	—	3.6	0.006	66	57
	0.22	0.22	—	2200	—	3.0	0.013	54	59
		0.47	—	2800	—	2.3	0.006	69	65
		1.0	—	3100	—	2.1	0.003	79	68
	0.47	0.47	—	4300	—	1.6	0.006	62	69
		1.0	—	5200	—	1.3	0.003	77	73
		2.2	—	5900	—	1.1	0.002	92	75

● At 2 volts (RMS) output. ■ At 3 volts (RMS) output. ★ At 4 volts (RMS) output



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

26

**See Circuit
Diagram 3**

E_{bb}	R_p	R_s	R_{s1}	R_k	C_{s1}	C_k	C	E_o	$V.G.^*$
90	0.1	0.1 0.22 0.47	0.35	1700	0.044 0.046 0.047	4.6 4.5 4.4	0.020 0.012 0.006	13 17 20	29 39 47
	0.22	0.22 0.47 1.0	0.80	3000	0.034 0.035 0.036	3.2 3.1 3.0	0.010 0.005 0.003	15 21 24	43 59 67
	0.47	0.47 1.0 2.2	1.9	7000	0.021 0.022 0.023	1.8 1.7 1.7	0.005 0.003 0.002	21 25 28	59 75 87
180	0.1	0.1 0.22 0.47	0.35	700	0.060 0.062 0.064	7.4 7.3 7.2	0.020 0.012 0.006	24 28 33	39 56 65
	0.22	0.22 0.47 1.0	0.80	1200	0.045 0.046 0.048	5.5 5.3 5.2	0.010 0.005 0.003	24 31 34	65 87 101
	0.47	0.47 1.0 2.2	1.9	2500	0.033 0.034 0.035	3.5 3.4 3.3	0.005 0.003 0.002	27 32 37	98 122 140
300	0.1	0.1 0.22 0.47	0.35	300	0.075 0.077 0.080	10.8 10.6 10.5	0.020 0.012 0.006	25 32 35	51 68 83
	0.22	0.22 0.47 1.0	0.80	600	0.056 0.057 0.058	7.9 7.5 7.4	0.010 0.005 0.003	28 37 41	81 109 123
	0.47	0.47 1.0 2.2	1.3	1200	0.044 0.046 0.047	5.3 5.2 5.1	0.005 0.003 0.002	35 42 48	125 152 174

* At an output voltage of 1 volt RMS and Grid No. 1 bias of 1 volt.

CHART FOR MAXIMUM VOLTAGE OUTPUT

E_{bb}	R_p	R_s	R_{s1}	R_k	C_{s1}	C_k	C	E_o	V.G.
90	0.1	0.1	0.12	2000	0.09	4.8	0.027	22	23
		0.22	0.15	2200	0.08	4.4	0.013	28	32
		0.47	0.17	2400	0.07	4.0	0.007	31	39
	0.22	0.22	0.35	3500	0.06	3.3	0.011	24	33
		0.47	0.40	3800	0.065	3.2	0.006	30	44
		1.0	0.44	4100	0.06	3.0	0.003	32	50
	0.47	0.47	0.90	6800	0.04	2.0	0.005	25	47
		1.0	1.0	7400	0.04	2.0	0.003	30	57
		2.2	1.1	8000	0.04	2.0	0.002	32	64

(Continued on next page)



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 3							Cont'd	26	
E _{bb}	R _p	R _s	R _{st}	R _k	C _{st}	C _k	C	E _o	V.G.
180	0.1	0.1	0.19	1300	0.08	6.0	0.021	48	33
		0.22	0.20	1400	0.08	5.85	0.013	59	46
		0.47	0.22	1500	0.07	5.45	0.007	68	57
	0.22	0.22	0.44	2000	0.09	4.85	0.011	48	41
		0.47	0.53	2300	0.07	4.45	0.006	62	62
		1.0	0.55	2400	0.065	4.25	0.004	68	72
	0.47	0.47	1.0	3500	0.07	3.5	0.005	51	54
		1.0	1.1	3700	0.07	3.5	0.003	59	66
		2.2	1.2	4000	0.07	3.3	0.002	66	81
300	0.1	0.1	0.18	1000	0.1	7.0	0.022	85	38
		0.22	0.2	1100	0.1	6.8	0.013	110	53
		0.47	0.23	1200	0.075	6.4	0.007	124	66
	0.22	0.22	0.47	1400	0.1	5.75	0.012	88	44
		0.47	0.52	1600	0.1	5.45	0.006	113	64
		1.0	0.58	1700	0.075	5.0	0.004	124	86
	0.47	0.47	1.1	2300	0.1	4.6	0.006	90	58
		1.0	1.2	2500	0.1	4.3	0.004	110	76
		2.2	1.3	2800	0.1	4.2	0.002	121	99



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

27 See Circuit Diagram 1							
E _{bb}	R _p	R _s	R _k	C _k	C	E _o	V.G.
90	0.047	0.047	1800	2.9	0.060	9	10#
		0.1	2100	2.4	0.033	12	11‡
		0.22	2200	2.3	0.016	14	21*
	0.1	0.1	3200	1.8	0.027	10	12‡
		0.22	3900	1.3	0.015	13	13*
		0.47	4300	1.0	0.007	16	13
	0.22	0.22	6200	0.87	0.015	12	13‡
		0.47	8100	0.53	0.006	16	13
		1.0	9000	0.49	0.003	19	14
180	0.047	0.047	1200	3.5	0.063	21	12
		0.1	1600	2.6	0.033	29	13
		0.22	1800	2.4	0.016	35	13
	0.1	0.1	2200	1.9	0.031	26	13
		0.22	2900	1.35	0.015	33	14
		0.47	3400	1.1	0.007	40	14
	0.22	0.22	4500	0.92	0.015	28	14
		0.47	6400	0.61	0.006	39	14
		1.0	8200	0.52	0.003	47	14
300	0.047	0.047	1100	3.9	0.063	42	13
		0.1	1500	2.8	0.033	65	13
		0.22	1700	2.5	0.016	71	14
	0.1	0.1	2000	2.1	0.032	45	15
		0.22	3400	1.4	0.015	74	15
		0.47	3700	1.1	0.007	83	15
	0.22	0.22	4300	0.97	0.015	50	15
		0.47	7200	0.63	0.007	88	15
		1.0	7400	0.63	0.003	94	15

At 2 volts (RMS) output. ‡ At 3 volts (RMS) output.

* At 4 volts (RMS) output.



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

See Circuit Diagram 1							28
E_{bb}	R_p	R_s	R_k	C_k°	C°	E_o	$V.G.^*$
90	0.1	0.24	1800	—	—	13	24
	0.24	0.51	3700	—	—	14	26
	0.51	1.0	7800	—	—	16	27
180	0.1	0.24	1300	—	—	31	27
	0.24	0.51	2800	—	—	33	29
	0.51	1.0	5700	—	—	33	30
300	0.1	0.24	1200	—	—	58	28
	0.24	0.51	2300	—	—	30	30
	0.51	1.0	4800	—	—	56	31

* At 2 volts (RMS) output.

[°] Coupling capacitors should be selected to give desired frequency response. Cathode resistors should be adequately bypassed.



RESISTANCE-COUPLED AMPLIFIER CHARTS (Continued)

29 See Circuit Diagram 1									
Ebb	R _p	R _g	R _{g2}	R _k	C _{g2}	C _k	C	E _o	V.G.
90	0.047	0.047	—	1870	—	3.1	0.063	14	13
		0.1	—	2230	—	2.5	0.031	18	14
		0.22	—	2500	—	2.1	0.016	20	14
	0.1	0.1	—	3370	—	1.8	0.034	15	14
		0.22	—	4100	—	1.3	0.015	20	14
		0.47	—	4800	—	1.1	0.006	23	15
	0.22	0.22	—	7000	—	0.80	0.013	16	14
		0.47	—	9100	—	0.65	0.007	22	14
		1.00	—	10500	—	0.60	0.004	25	15
180	0.047	0.047	—	1500	—	3.6	0.066	33	14
		0.1	—	1860	—	2.9	0.055	41	14
		0.22	—	2160	—	2.2	0.015	47	15
	0.1	0.1	—	2750	—	1.8	0.028	35	15
		0.22	—	3550	—	1.4	0.015	45	15
		0.47	—	4140	—	1.3	0.007	51	16
	0.22	0.22	—	5150	—	1.0	0.016	36	16
		0.47	—	7000	—	0.71	0.007	45	16
		1.00	—	7800	—	0.61	0.004	51	16
300	0.047	0.047	—	1300	—	3.6	0.061	59	14
		0.1	—	1580	—	3.0	0.032	73	15
		0.22	—	1800	—	2.5	0.015	83	16
	0.1	0.1	—	2500	—	1.9	0.031	68	16
		0.22	—	3130	—	1.4	0.014	82	16
		0.47	—	3900	—	1.2	0.0065	96	16
	0.22	0.22	—	4800	—	0.95	0.015	68	16
		0.47	—	6500	—	0.69	0.0065	85	16
		1.00	—	7800	—	0.58	0.0035	96	16



MAX. D-C HEATER-CATHODE POTENTIALS OF RECEIVING TYPES

Based on JAN Specifications as of January 3, 1944

The following Receiving Tubes appear in the JAN Specifications as having an absolute maximum heater-cathode potential rating of 100 volts. The corresponding design-center maximum rating may be taken as 90 volts, the value which should be used in connection with the respective data sheets in this Section except as noted below. Receiving types for which heater-cathode potential ratings are given on their data pages are not included in this list.

2A5	6K8-G	12SF7
2B7	*6L5-G	12SG7
6A6	6L7	12SH7
6A7	6L7-G	12SJ7
6A8-G	6N7	12SK7
6A8-GT	6N7-GT/G	12SK7-GT/G
6AB7	6Q7	12SL7-GT
6AC7	6Q7-G	12SN7-GT
6AG7	6Q7-GT	12SR7
6B7	6SA7	*24-A
6B8	6SA7-GT/G	25L6
6B8-G	6SC7	25L6-GT/G
6C5	6SF5	*27
6C6	6SG7	*35
6C8-G	6SH7	35L6-GT
6D6	6SJ7	36
6E5	6SK7	*37
6F5	6SK7-GT/G	*38
6F5-GT/G	6SL7-GT	39/44
6F6	6SN7-GT	41
6F6-G	6SR7	42
6F7	6SS7	50L6-GT
6F8-G	6ST7	53
6G6-G	6U5/6G5	56
6J5	6V6	57
6J5-GT/G	6V6-GT/G	58
6J7	12AH7-GT	*59
6J7-G	12C8	75
6J7-GT	12J5-GT	76
6K6-GT/G	12K7-GT/G	77
6K7	12Q7-GT/G	78
6K7-G	12SA7	*79
6K7-GT	12SA7-GT/G	*85
6K8	12SC7	

* Data sheet for this type is on an *absolute rating* basis.

(Tentative)

JAN. 15, 1944

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

REC. TUBE H-K
POTENTIALS



GRID-No. 2 INPUT RATING CHART

The Grid-No.2 Input Rating Chart shown on the back of this page presents graphically the relationship between the grid-No.2 voltage and the maximum grid-No.2 input for certain multi-electrode tube types.

The chart shows that full rated grid-No.2 input is permissible at grid-No.2 voltages up to 50 per cent of the maximum rated grid-No.2 supply voltage. From the 50 per cent point to the full rated value of supply voltage, the grid-No.2 input must be decreased. The decrease in allowable grid-No.2 input follows a curve of the parabolic form.

This chart is useful for applications utilizing either a fixed grid-No.2 voltage, or a series grid-No.2 voltage-dropping resistor.

Where a fixed grid-No.2 voltage is used, it is necessary only to determine that the grid-No.2 input is within the boundary of the operating area on the chart at the selected value of grid-No.2 voltage to be used.

Where a grid-No.2 voltage-dropping resistor is used, the minimum value of resistor that will assure tube operation within the boundary of the curve can be determined from the following relation:

$$R_{g2} \geq \frac{E_{c2} (E_{cc2} - E_{c2})}{P_{c2}}$$

where:

R_{g2} = minimum value for grid-No.2 voltage-dropping resistor in ohms.

E_{c2} = selected value of grid-No.2 voltage in volts.

E_{cc2} = grid-No.2 supply voltage in volts.

P_{c2} = grid-No.2 input in watts corresponding to E_{c2} .

EXAMPLES

Example 1 - Use of a Fixed Grid-No.2 Supply Voltage:

The tube data for a certain tube stipulates a maximum grid-No.2 supply voltage rating of 300 volts, and a maximum grid-No.2 input rating of 1 watt. It is desired to operate the tube with a fixed voltage of 200 volts between grid No.2 and cathode. This value is 66-2/3% of the maximum grid-No.2 supply voltage rating. From the chart, the maximum grid-No.2 input, therefore, must be limited to 88% of the maximum grid-No.2 input rating or 0.88 watt.

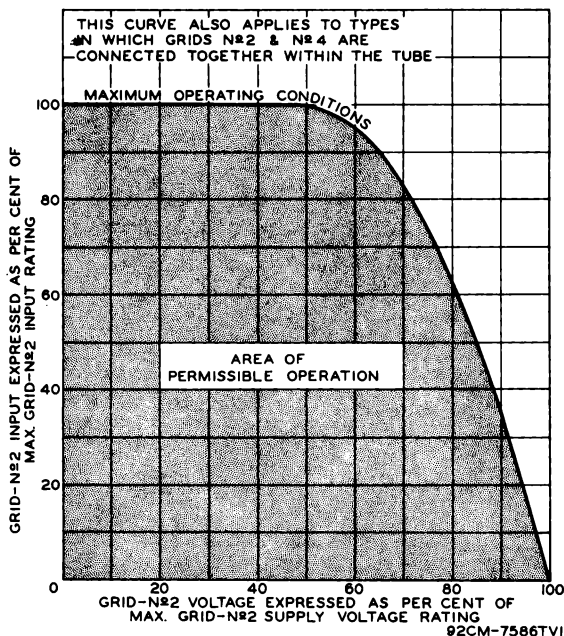


GRID-No. 2 INPUT RATING CHART

Example 2 - Use of a Grid-No. 2 Voltage-Dropping Resistor:

The tube data for a certain tube stipulates a maximum grid-No. 2 supply voltage rating of 300 volts, and a maximum grid-No. 2 input rating of 1 watt. It is desired to operate the tube with a grid-No. 2-to-cathode voltage of 250 volts, obtained through a dropping resistor from a 300-volt power supply. Because 250 volts is 83% of 300 volts, the maximum grid-No. 2 input must be limited, as shown on the chart, to 56% of the maximum grid-No. 2 input rating, or 0.56 watt. Then, the minimum value required for the grid-No. 2 voltage-dropping resistor will be:

$$R_{g2} = \frac{250 (300 - 250)}{0.56} = 22,320 \text{ ohms}$$

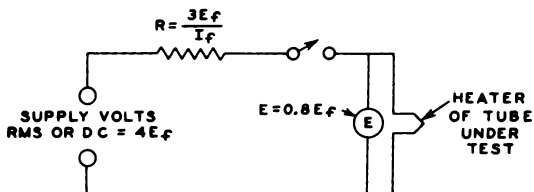




HEATER WARM-UP TIME MEASUREMENT FOR TUBE TYPES INTENDED FOR USE IN SERIES HEATER-STRING ARRANGEMENT

Heater warm-up time is measured in the circuit shown below as follows: The heater is placed in series with a resistance having a value 3 times the heater operating resistance. A voltage having a value 4 times the rated heater voltage is then applied. Heater warm-up time is then defined as the time required for the voltage across the heater to reach 80 per cent of its rated value.

TEST CIRCUIT FOR DETERMINING HEATER WARM-UP TIME



E_f = RATED HEATER VOLTAGE OF TUBE UNDER TEST.
 I_f = RATED HEATER CURRENT OF TUBE UNDER TEST.

92CS-8503



0Z4-G

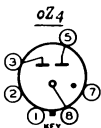
0Z4, 0Z4-G

FULL-WAVE GAS RECTIFIER

COLD CATHODE TYPE

	<u>0Z4</u>	<u>0Z4-G</u>
Maximum Overall Length	2-5/8"	2-5/8"
Maximum Diameter	1-5/16"	1-1/16"
Bulb	Metal Shell, MT-8	T-7
Base	Small Wafer Octal 6-Pin	Dwarf Shell Octal 5-Pin

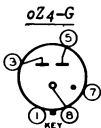
Pin 1 - Shell
Pin 2 - No Connection
Pin 3 - Plate #2



BOTTOM VIEW

Pin 5 - Plate #1
Pin 7 - No Connection
Pin 8 - Cathode

Pin 1 - No Connection
Pin 3 - Plate #2
Pin 5 - Plate #1



BOTTOM VIEW

Pin 7 - No Connection
Pin 8 - Cathode

MAXIMUM RATINGS

Starting-Supply Voltage per Plate	300 min. peak volts
Peak Plate-to-Plate Voltage	1000 max. volts
Peak Plate Current	200 max. ma.
D-C Output Current	{ 75 max. ma.
	{ 30 min. ma.
D-C Output Voltage	300 max. volts
Average Dynamic Tube Voltage Drop	24 volts



1A3

H-F DIODE MINIATURE TYPE

Heater	Coated Unipotential Cathode	
Voltage	1.4	a-c or d-c volts
Current	0.15	amp.
Direct Interelectrode Capacitances (Approx.):°		
Plate to Cathode	0.4	μμf
Plate to Heater	0.8	μμf
Heater to Cathode	0.6	μμf
Maximum Overall Length		2-1/8"
Maximum Seated Height		1-7/8"
Length from Base Seat		
to Bulb Top (excluding tip)		1-1/2" ± 3/32"
Maximum Diameter		3/4"
Bulb		T-5-1/2
Base▲		Miniature Button 7-Pin
Pin 1-Heater		Pin 5 { Internal Con.
Pin 2-Plate		Pin 5 { Do Not Use
Pin 3-Cathode		Pin 6-Plate
Pin 4-No Connection		Pin 7-Heater



RCA Socket

Mounting Position

BOTTOM VIEW (5AP₂)

Stock No. 9914

Any

Maximum Ratings Are Design-Center Values

RECTIFIER

Peak Inverse Plate Voltage	330 max. volts	←
Peak Plate Current	5 max. ma.	←
D-C Output Current	0.5 max. ma.	
D-C Heater-Cathode Potential	140 max. volts	←
Typical Operation with Condenser-Input Filter:		←
A-C Plate Supply Voltage (RMS)	117	volts
Filter Input Condenser	2	μf
Min. Total Effective Plate-Supply Impedance	0	ohms

The resonant frequency of the 1A3 is approximately 1000 Mc.

° With no external shield.

▲ The center hole in sockets designed for this base provides for the possibility that this tube type may be manufactured with the exhaust-tube tip at the base end. For this reason, it is recommended that in equipment employing this tube type, no material be permitted to obstruct the socket hole.

← Indicates a change

AUG. 2, 1943

RCA VICTOR DIVISION

DATA

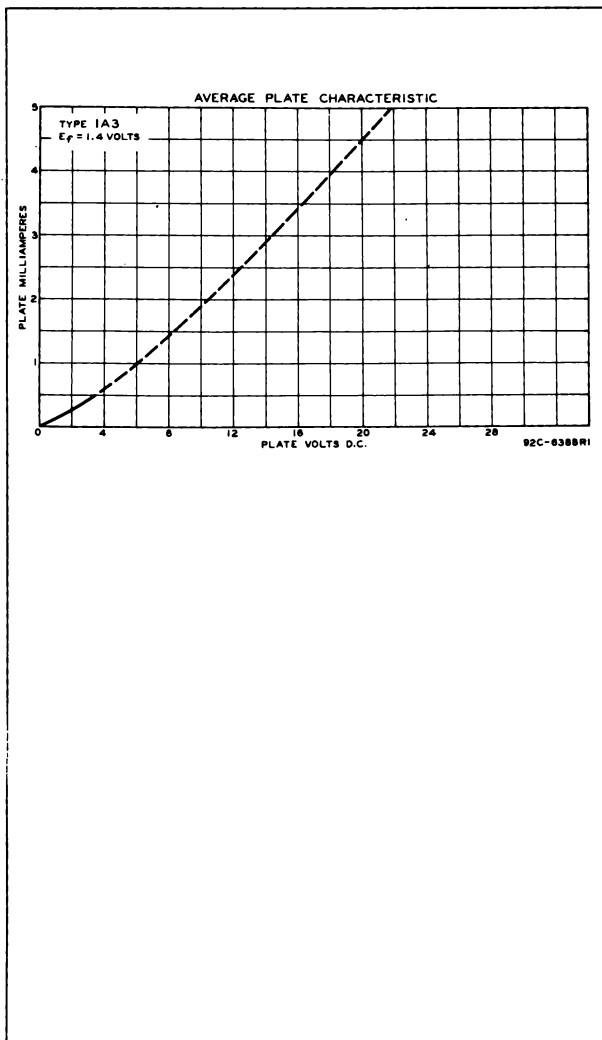
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1A3



1A3

H-F DIODE



AUG. 2, 1943

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-6388R1



1A4-P



1A4-P

SUPER-CONTROL R-F AMPLIFIER PENTODE

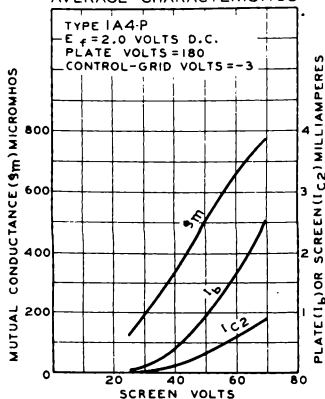
Filament	Coated	
Voltage	2.0	d-c volts
Current	0.060	amp.
Direct Interelectrode Capacitances:		
Grid to Plate (with shield-can)	0.007 max.	μmf
Input	5	μmf
Output	11	μmf
Overall Length	4-9/32" to 4-17/32"	
Maximum Diameter	1-9/16"	
Bulb	ST-12	
Cap		Small Metal
Base		Small 4-Pin
Pin 1-Filament +		Pin 4-Filament -
Pin 2-Plate		Cap -Grid
Pin 3-Screen		

BOTTOM VIEW

AMPLIFIER - Class A**Operating Conditions and Characteristics:**

Filament	2.0	2.0	d-c volts
Plate	90	180 max.	volts
Screen	67.5	67.5 max.	volts
Grid	-3	-3	min.volts
Amp. Fact.	425	750	
Plate Res.	0.6	1.0	approx. megohm
Mut. Cond.	720	750	μmhos
Mut. Cond. *	15	15	μmhos
Plate Cur.	2.2	2.3	ma.
Screen Cur.	0.9	0.8	ma.

* At -15 volts bias.

AVERAGE CHARACTERISTICS

92C-4655

SEPT. 30, 1936

RCA RADITRON DIVISION
RCA MANUFACTURING COMPANY, INC.

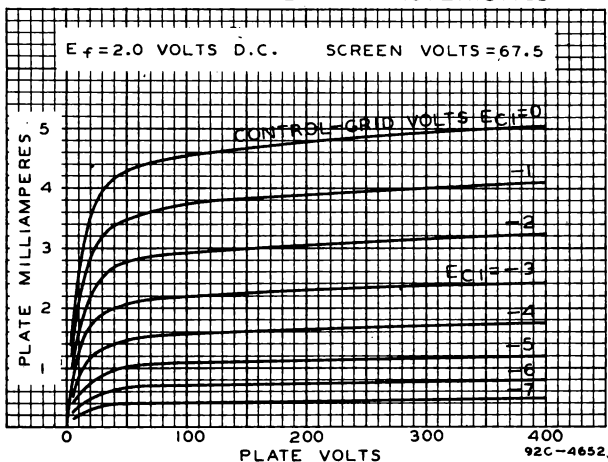
TENTATIVE DATA

1A4-P

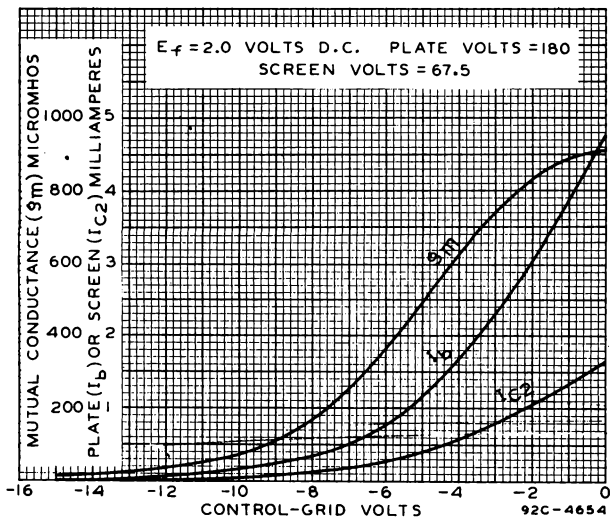


1A4-P

AVERAGE PLATE CHARACTERISTICS



AVERAGE CHARACTERISTICS



AUG. 21, 1936

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-4665



1A5-GT/1A5-G



POWER AMPLIFIER PENTODE

Filament	Coated	
Voltage	1.4	d-c volts
Current	0.05	amp.
Maximum Overall Length		3-5/16"
Maximum Seated Height		2-3/4"
Maximum Diameter		1-5/16"
Bulb		T-9
Base	Intermediate Shell Octal 7-Pin	
Pin 1 - No Connection	Pin 5 - Grid	
Pin 2 - Filament +	Pin 7 - Filament -	
Pin 3 - Plate	Pin 8 - No Connection	
Pin 4 - Screen		
Mounting Position		Any



BOTTOM VIEW (G-6X)

AMPLIFIER

Plate Voltage	110 max.	volts
Screen Voltage	110 max.	volts
Total Zero-Sig. Cathode Current	6 max.	ma.
<i>Typical Operation and Characteristics - Class A₁ Amplifier:</i>		
Plate	85	90 volts
Screen	85	90 volts
Grid *	-4.5	-4.5 volts
Peak A-F Grid Volt.	4.5	4.5 volts
Zero-Sig. Plate Cur.	3.5	4.0 ma.
Max.-Sig. Plate Cur.	3.5	4.0 ma.
Zero-Sig. Screen Cur.	0.7	0.8 ma.
Max.-Sig. Screen Cur.	1.0	1.1 ma.
Plate Res.	0.3	0.3 approx. ohms
Transcond.	800	850 μ mhos
Load Res.	25000	25000 ohms
Total Harmonic Dist.	10	7 %
Max.-Sig. Power Output	100	115 mw

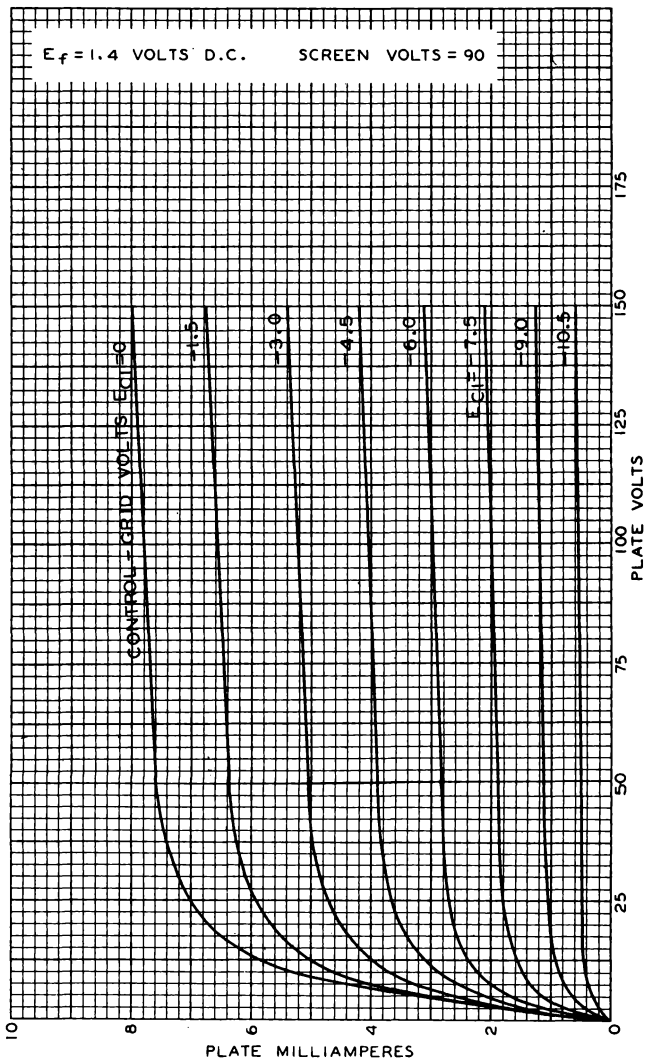
* Self-bias is recommended so that grid bias will be proportionately less as the B-supply voltage falls off during battery life.

1A5-GT



1A5-GT

AVERAGE PLATE CHARACTERISTICS



NOV. 10, 1938

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

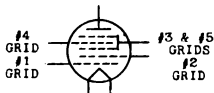
92C-4998

PENTAGRID CONVERTER

Filament Voltage	Coated	d-c volts
Current	2.0	amp.
	0.060	

Direct Interelectrode Capacitances (approx.):

C_{g_4p}	0.25 [⊙]	μf
$C_{g_4g_2}$	0.2 [⊙]	μf
$C_{g_4g_1}$	0.1 [⊙]	μf
$C_{g_1g_2}$	0.8	μf
$C_{g_4(k+g_1+g_2+g_3+g_5+p)}$	i0.5	μf
$C_{g_2(k+g_1+g_3+g_4+g_5+p)}$	6	μf
$C_{g_1(k+g_2+g_3+g_4+g_5+p)}$	5	μf
$C_p(k+g_1+g_2+g_3+g_4+g_5)$	9	μf



Overall Length	1-9/32" to 4-17/32"
Maximum Diameter	1-9/16"
Bulb	ST-12
Cap	Small Metal
Base	Small 6-Pin
Pin 1-Filament+	Pin 5-Grids #3 & #5
Pin 2-Plate	Pin 6-Filament-Cap
Pin 3-Grid #2	
Pin 4-Grid #1	

BOTTOM VIEW

CONVERTER SERVICE

Plate Voltage	180 max.	volts
Screen (Grids #3 & #5) Voltage	67.5 max.	volts
Anode-Grid (Grid #2) Voltage	135 max.	volts
Anode-Grid Voltage Supply*	180 max.	volts
Control-Grid (Grid #4) Voltage	-3 min.	volts
Total Cathode Current	9 max.	ma.

Typical Operation:

Filament	2.0	2.0	d-c volts
Plate	135	180	volts
Screen	67.5	67.5	volts
Anode-Grid	135	135	volts
Anode-Grid Supply	135	180*	volts
Control-Grid	-3	-3	volts
Oscillator-Grid (Grid #1) Res.	50000	50000	ohms
Plate Resistance	0.4	0.5	megohm
Conversion Cond.	275	300	μmhos
Conversion Cond. at -22.5 volts on Grid #4	4	4	μmhos
Plate Current	1.2	1.3	ma.
Screen Current	2.5	2.4	ma.
Anode-Grid Current	2.3	2.3	ma.
Oscillator-Grid Cur.	0.2	0.2	ma.
Total Cathode Current	6.2	6.2	ma.

* Applied through a 20000-ohm voltage-dropping resistor, by-passed by 0.1 μf condenser ←

The mutual conductance of the oscillator portion (not oscillating) of the 1A6 is 425 micromhos under the following conditions: plate voltage, 135 to 180 volts; screen voltage, 67.5 volts; anode-grid voltage (no voltage-dropping resistor), 135 volts; and oscillator-grid voltage, 0 volts. Under these same conditions, the anode-grid current is 2.3 milliamperes.

⊙ With shield-can.

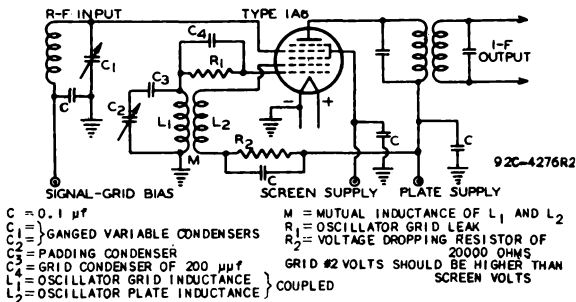
← Indicates a change

1A6



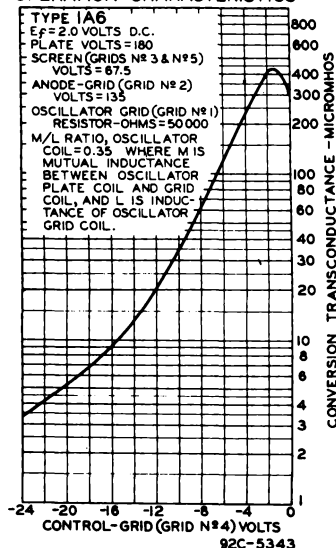
PENTAGRID CONVERTER

TYPICAL PENTAGRID CONVERTER CIRCUIT



The license extended to the purchaser of tubes appears in the License Notice accompanying them. Information contained herein is furnished without assuming any obligations.

OPERATION CHARACTERISTICS





1A7-GT/G

1A7-GT/G

PENTAGRID CONVERTER

Filament	Coated	
Voltage	1.4	d-c volts
Current	0.05	amp.
Direct Interelectrode Capacitances: ^o		
Grid #4 to Plate	0.5 max.	$\mu\mu\text{f}$
Grid #4 to Grid #2	0.4 max.	$\mu\mu\text{f}$
Grid #4 to Grid #1	0.2 max.	$\mu\mu\text{f}$
Grid #1 to Grid #2	0.9	$\mu\mu\text{f}$
Grid #4 to All Other Electrodes (R-F Input)	7.0	$\mu\mu\text{f}$
Grid #2 to All Other Electrodes Except		
Grid #1 (Osc. Output)	4.4	$\mu\mu\text{f}$
Grid #1 to All Other Electrodes Except		
Grid #2 (Osc. Input)	3.4	$\mu\mu\text{f}$
Plate to All Other Electrodes (Mixer Output)	10	$\mu\mu\text{f}$

Maximum Overall Length	3-5/16"
Maximum Seated Height	2-3/4"
Maximum Diameter	1-5/16"

Bulb T-9

Cap Skirted Miniature

Base Small Wafer Octal 8-Pin, Sleeve

Pin 1 - Base Sleeve

Pin 2 - Filament +

Pin 3 - Plate

Pin 4 - Grids #3 & #5

Pin 5 - Grid #1

Pin 6 - Grid #2

Pin 7 - Filament -

Pin 8 - No Connection

Cap - Grid #4

Mounting Position

Any



BOTTOM VIEW (GT-7Z)

Maximum Ratings Are Design-Center Values

CONVERTER SERVICE

Plate Voltage	110 max.	volts
Screen (Grids #3 & #5) Voltage	60 max.	volts
Screen Supply Voltage	110 max.	volts
Anode-Grid (Grid #2) Voltage	110 max.	volts
Total Zero-Sig. Cathode Current	4 max.	ma.
Typical Operation:		
Plate	90	volts
Screen **	45	volts
Anode-Grid	90	volts
Control-Grid (Grid #4)*	0	volts
Oscillator-Grid (Grid #1) Resistor	200000	ohms
Plate Res.	0.6	megohm
Conversion Transcond.	250	μmhos
Conversion Transcond. with		
Grid #4 bias of -3 volts	5 approx.	μmhos
Plate Cur.	0.6	ma.
Screen Cur.	0.7	ma.
Anode-Grid Cur.	1.2	ma.
Oscillator-Grid Cur.	0.035	ma.
Total Cathode Cur.	2.5	ma.

NOTE: The transconductance of the oscillator portion (not oscillating) is 550 micromhos under the following conditions: plate volts, 90; screen volts, 45; control-grid volts, 0; anode-grid volts, 90; and oscillator-grid volts, 0.

^o With external shield connected to negative filament terminal.

** Obtained preferably by using a properly by-passed 45000- to 75000-ohm voltage-dropping resistor in series with the 90-volt supply.

* A resistance of at least 1.0 megohm should be in the grid return to negative filament pin. ← Indicates a change.

Typical Pentagrid Converter Circuit is shown under Type 1A8.

Jan. 1, 1943

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

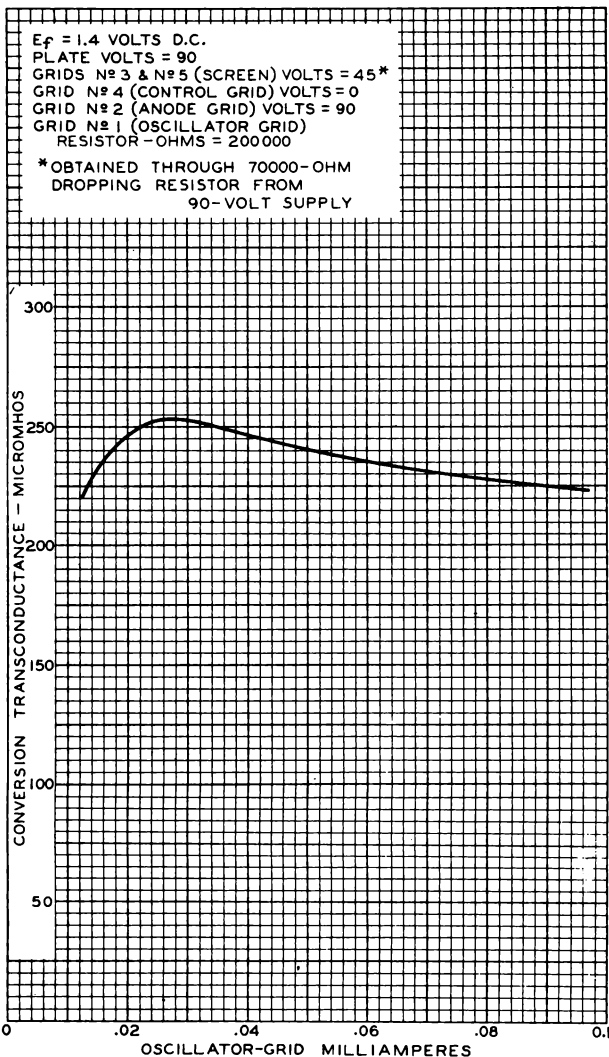
DATA

1A7-GT/G



1A7-GT/G

OPERATION CHARACTERISTIC



OCT. 23, 1939

RCA VICTOR DIVISION
 RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92C-6091



IAC5

IAC5

POWER PENTODE

SUBMINIATURE TYPE

GENERAL DATA

Electrical:

Filament, Coated:

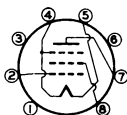
Voltage	1.25	dc volts
Current	0.04	amp

Mechanical:

Mounting Position	- Any
Maximum Overall Length	1-3/4"
Maximum Seated Length	1-1/2"
Length, Base Seat to Bulb Top (excluding tip)	1.200" $\pm$ 0.060"
Maximum Diameter	0.4"
Bulb	T-3
Base	Small-Button Sub-minar 8-Pin

BOTTOM VIEW

- Pin 1 - No Connection
Pin 2 - Grid No.1
Pin 3 - No Connection
Pin 4 - Filament (-),
Grid No.3



- Pin 5 - Filament (+)
Pin 6 - No Connection
Pin 7 - Plate
Pin 8 - Grid No.2

AMPLIFIER - Class A₁

Maximum Ratings, Design-Center Values:

PLATE VOLTAGE	67.5 max.	volts
GRID-No. 2 (SCREEN) VOLTAGE	67.5 max.	volts
TOTAL CATHODE CURRENT	4.0 max.	ma

Typical Operation and Characteristics:

Plate Voltage	30	45	67.5	volts
Grid-No.2 Voltage	30	45	67.5	volts
Grid-No.1 (Control-Grid) Voltage	-2	-3	-4.5	volts
Peak AF Grid-No.1 Voltage	2	3	4.5	volts
Zero-Signal Plate Current	0.5	1.0	2.0	ma
Zero-Signal Grid-No.2 Current	0.1	0.2	0.4	ma
Plate Resistance	0.2	0.17	0.15	megohm
Transconductance	450	600	750	μ mhos
Load Resistance	50000	40000	25000	ohms
Total Harmonic Distortion	10	10	10	%
Max.-Signal Power Output	5	15	50	mw

SEPT. 15, 1949

TUBE DEPARTMENT

TENTATIVE DATA

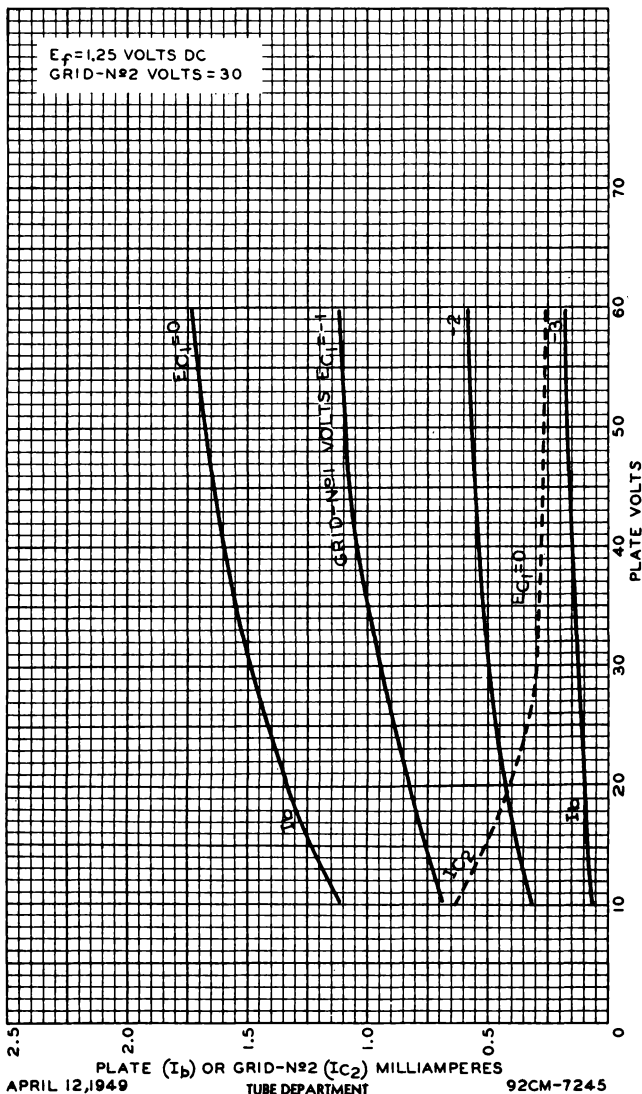
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

IAC5



IAC5

AVERAGE PLATE CHARACTERISTICS

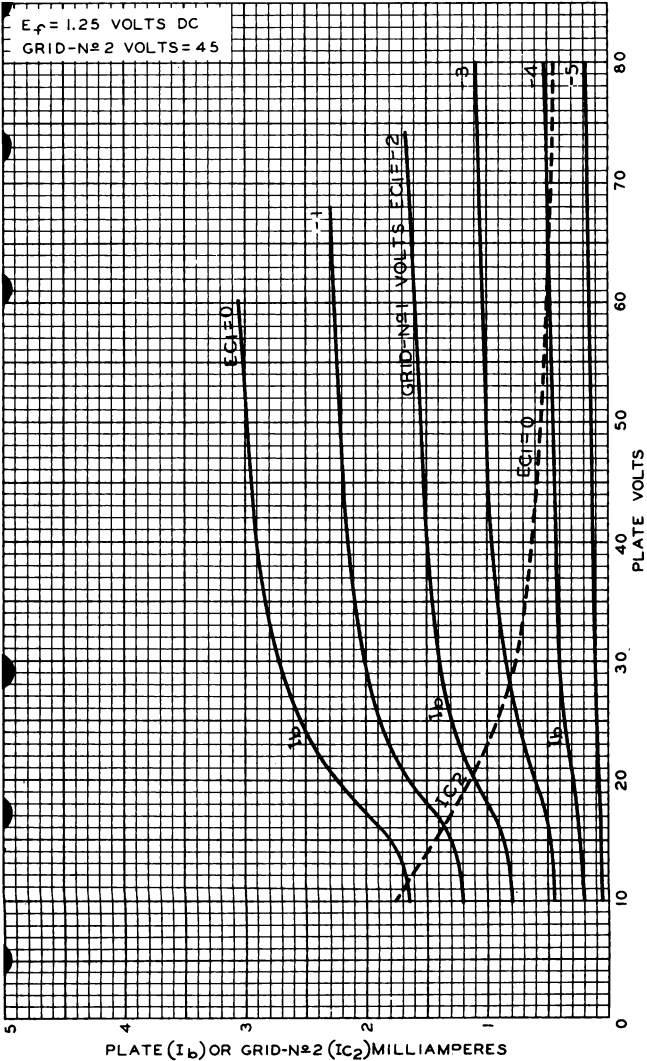




1AC5

1AC5

AVERAGE PLATE CHARACTERISTICS



APRIL 26, 1949

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

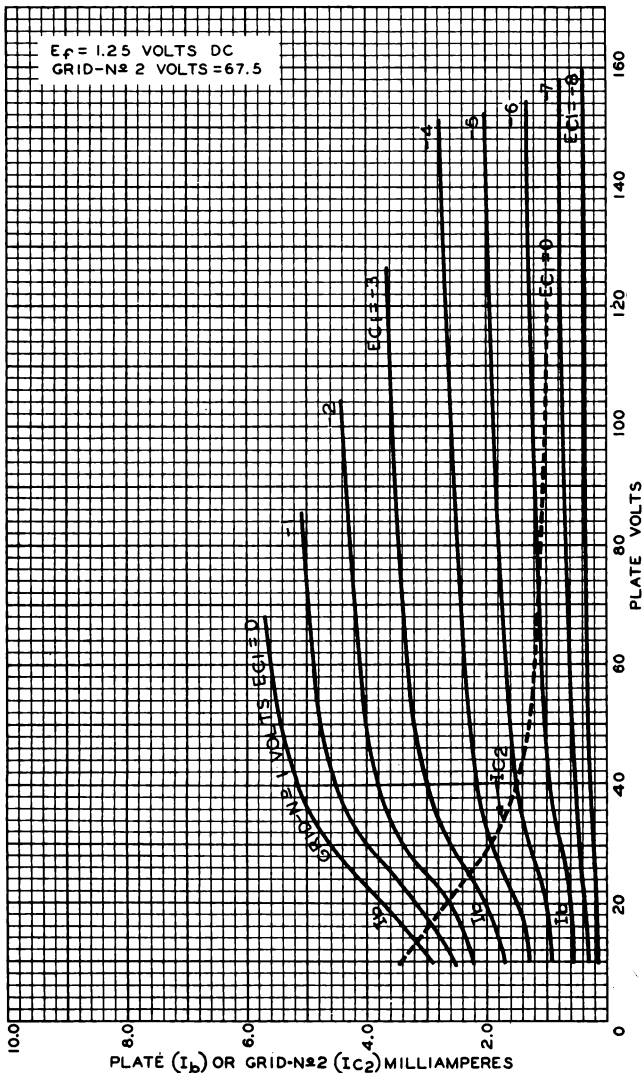
92CM-7261

IAC5



IAC5

AVERAGE PLATE CHARACTERISTICS



APRIL 13, 1949

TUBE DEPARTMENT

92CM-7247

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



IAD5

IAD5

SHARP-CUTOFF PENTODE

SUBMINIATURE TYPE

GENERAL DATA**Electrical:**

Filament, Coated:

Voltage 1.25 dc volts

Current 0.04 amp

Direct Interelectrode Capacitances:⁰Grid No.1 to Plate . . . 0.010 max. μuf Input 1.8 μuf Output 2.8 μuf ⁰ With no external shield.**Mechanical:**

Mounting Position Any

Maximum Overall Length 1-3/4"

Maximum Seated Length 1-1/2"

Length, Base Seat to Bulb Top (excluding tip) 1.200 $\pm$ 0.060"

Maximum Diameter 0.4"

Bulb T-3

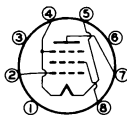
Base Small-Button Sub-minar 8-Pin

BOTTOM VIEW

Pin 1—No Connection

Pin 2—Grid No.1

Pin 3—No Connection

Pin 4—Filament (-),
Grid No.3

Pin 5—Filament (+)

Pin 6—No Connection

Pin 7—Plate

Pin 8—Grid No.2

AMPLIFIER—Class A₁**Maximum Ratings, Design-Center Values:**

PLATE VOLTAGE 67.5 max. volts

GRID-No.2 (SCREEN) VOLTAGE 67.5 max. volts

TOTAL CATHODE CURRENT 4.0 max. ma

Typical Operation and Characteristics:

Plate Voltage 30 45 67.5 volts

Grid-No.2 Voltage 30 45 67.5 volts

Grid-No.1 (Control-Grid) Voltage . . . 0 0 0 volts

Plate Resistance (Approx.) 0.7 0.7 0.7 megohm

Transconductance 430 580 735 μmos

Grid-No.1 Bias (Approx.) for

plate current of 10 μamp -3 -4 -6 volts

Plate Current 0.45 0.9 1.85 ma

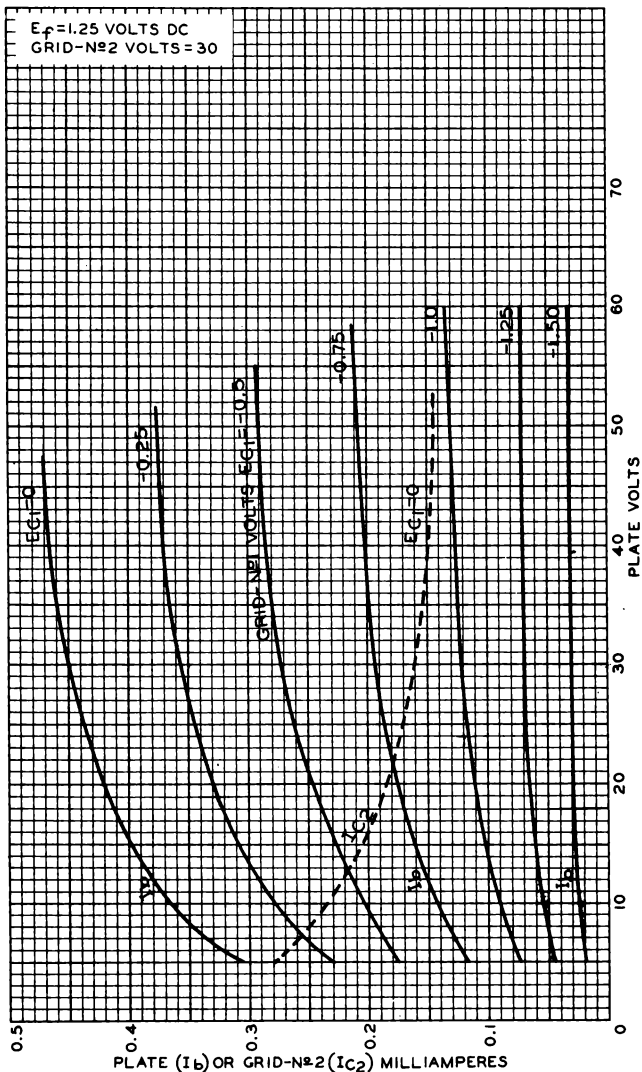
Grid-No.2 Current 0.16 0.35 0.75 ma

IAD5



IAD5

AVERAGE PLATE CHARACTERISTICS



APRIL 19, 1949

TUBE DEPARTMENT

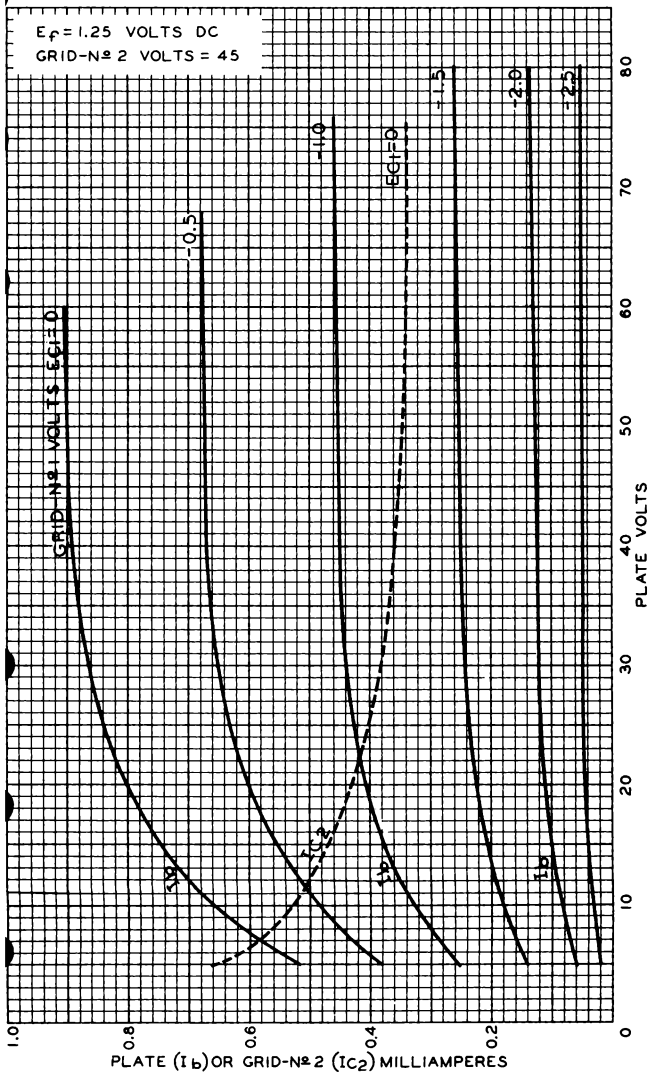
92CM-7253

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



IADS

E_f = 1.25 VOLTS DC
GRID-N^o 2 VOLTS = 45



APRIL 19, 1949

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

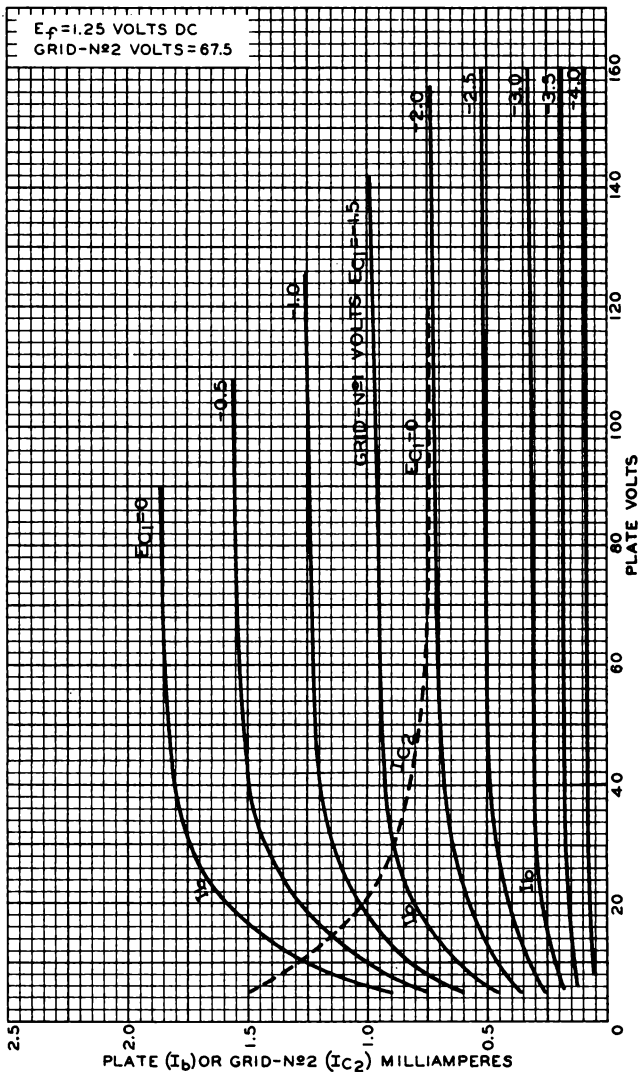
92CM-7251

IAD5



IAD5

AVERAGE PLATE CHARACTERISTICS



APRIL 19, 1949

TUBE DEPARTMENT

92CM-7252

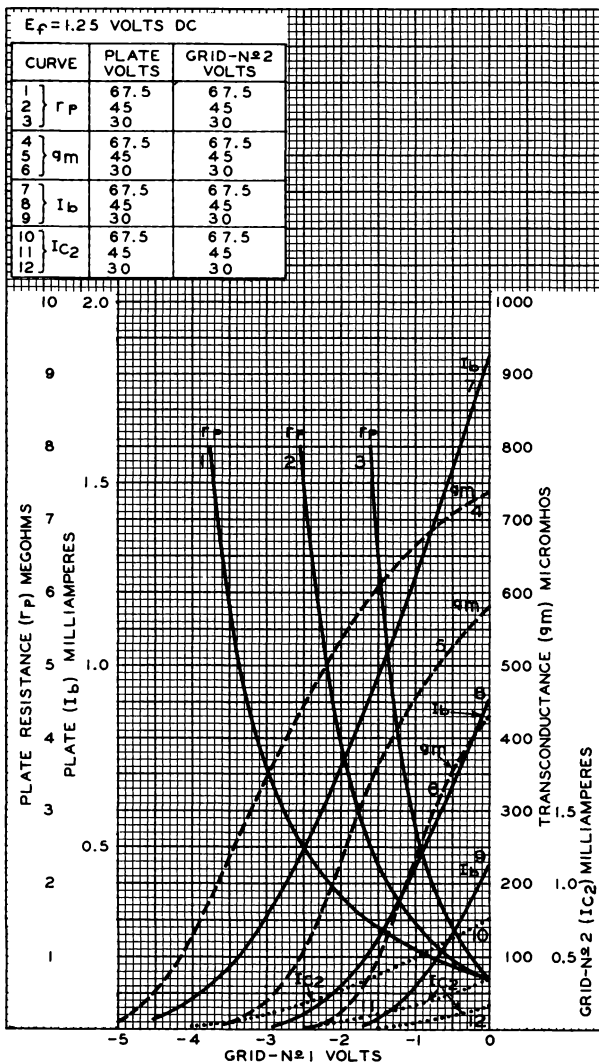
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



IAD5

IAD5

AVERAGE CHARACTERISTICS



APRIL 18, 1949

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7250



1AX2

HALF-WAVE VACUUM RECTIFIER

9-PIN MINIATURE TYPE

GENERAL DATA

Electrical:

Filament, Coated:

Voltage 1.4 ac volts

Current 0.65 amp

Direct Interelectrode Capacitance:^o

Plate to filament 0.7 max. μf

Mechanical:

Mounting Position Any

Maximum Overall Length 2-27/32"

Seated Length 2-7/16" $\pm$ 1/8"

Maximum Diameter 7/8"

Dimensional Outline See General Section

Bulb T-6-1/2

Cap Skirted Miniature (JETEC No.C1-2 or C1-33)

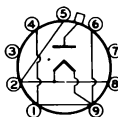
Base Small-Button Noval 9-Pin (JETEC No.E9-1)

Basing Designation for BOTTOM VIEW 9Y

Pin 1 - Filament,
Internal
Shield

Pin 2 - Filament
Pin 3 - No Connec-
tion♦

Pin 4 - Same as Pin 1



Pin 5 - Same as Pin 2

Pin 6 - Same as Pin 1

Pin 7 - Same as Pin 3

Pin 8 - Same as Pin 2

Pin 9 - Same as Pin 1

Cap - Plate

PULSED-RECTIFIER SERVICE

Maximum Ratings, Design-Center Values Except as Noted:

For operation in a 525-line, 30-frame system[□]

PEAK INVERSE PLATE VOLTAGE

(Absolute maximum) 25000[■] max. volts

PEAK PLATE CURRENT 11 max. ma

AVERAGE PLATE CURRENT 1 max. ma

Typical Operation:

Peak Plate Supply Voltage:

Positive pulse value 20000 volts

Negative pulse value 5000 volts

DC Output Voltage (Approx.) 20000 volts

DC Output Current (Approx.) 300 μamp

^o Without external shield.

♦ May be connected to one side of filament, or used as a tie point for filament dropping resistor; otherwise do not use.

□ As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations", Federal Communications Commission.

■ Under no circumstances should this absolute value be exceeded.

1AX2



1AX2

HALF-WAVE VACUUM RECTIFIER

OPERATING CONSIDERATIONS

Filament Voltage Adjustment. When the filament is supplied from an rf source and is at a high dc potential above ground, adjustment of the filament voltage by direct measurement is impractical. To insure that the rated voltage is applied to the filament, a simple method utilizing a visual color match of two incandescent filaments in a darkened room may be used. In this method, the rf filament voltage, obtained from a pulse-power source, is adjusted until the color of this filament matches that of the filament of another 1AX2 operated from a dc or low-frequency ac supply of 1.4 volts.

X-rays. The voltages employed in some television receivers and other high-voltage equipment are sufficiently high that high-voltage rectifier tubes may produce X-rays which can constitute a health hazard unless such tubes are adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.



IB3-GT

IB3-GT/8016 HALF-WAVE VACUUM RECTIFIER

Supersedes Type 8016

GENERAL DATA

Electrical:

Filament, Coated:

Voltage. 1.25* ac volts

Current. 0.2 amp

Direct Interelectrode Capacitance (Approx.):•

Plate to Filament. 1.5 μ f

* The filament voltage must never exceed 1.5 volts, even momentarily.

• With no external shield.

Mechanical:

Mounting Position. Any

Overall Length. 3-7/8" $\pm$ 3/16"

Seated Length. 3-5/16" $\pm$ 3/16"

Maximum Diameter. 1-9/32" ←

Bulb T-9

Cap. Small

Base Intermediate-Shell Octal 6-Pin ←

Basing Designation for BOTTOM VIEW 3C

Pin 1—See NOTE

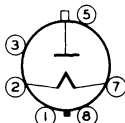
Pin 2—Filament

Pin 3—Same as Pin 1

Pin 5—Same as Pin 1

Pin 7—Filament,
Internal
Shield

Pin 8—Same as Pin 1
Cap — Plate



NOTE: May be connected to pin 7;
otherwise, do not use.

HALF-WAVE RECTIFIER

Maximum Ratings, Design-Center Values:

PEAK INVERSE PLATE VOLTAGE 30000 max. volts ←

PEAK PLATE CURRENT 17 max. ma

AVERAGE PLATE CURRENT. 2 max. ma

FREQUENCY OF SUPPLY VOLTAGE. 300 max. kc

OPERATING NOTES

When the filament is to be operated on rf, it is recommended that the filament be connected first to a dc or low-frequency ac supply of 1.25 volts. The color temperature of the filament corresponding to this voltage may then be checked visually by observing in a darkened room the reflection of the incandescent filament upon the upper surface of the internal shield. A visual comparison of this color temperature with that obtained with the filament operated from an rf voltage provides a convenient means for adjusting the amount of rf excitation to produce 1.25 volts (RMS) at the filament terminals.

The voltages employed in some television receivers and other high-voltage equipment are sufficiently high that high-voltage rectifier tubes may produce soft x-rays which can constitute a health hazard, unless such tubes are adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.

← Indicates a change.

NOV. 15, 1949

TUBE DEPARTMENT

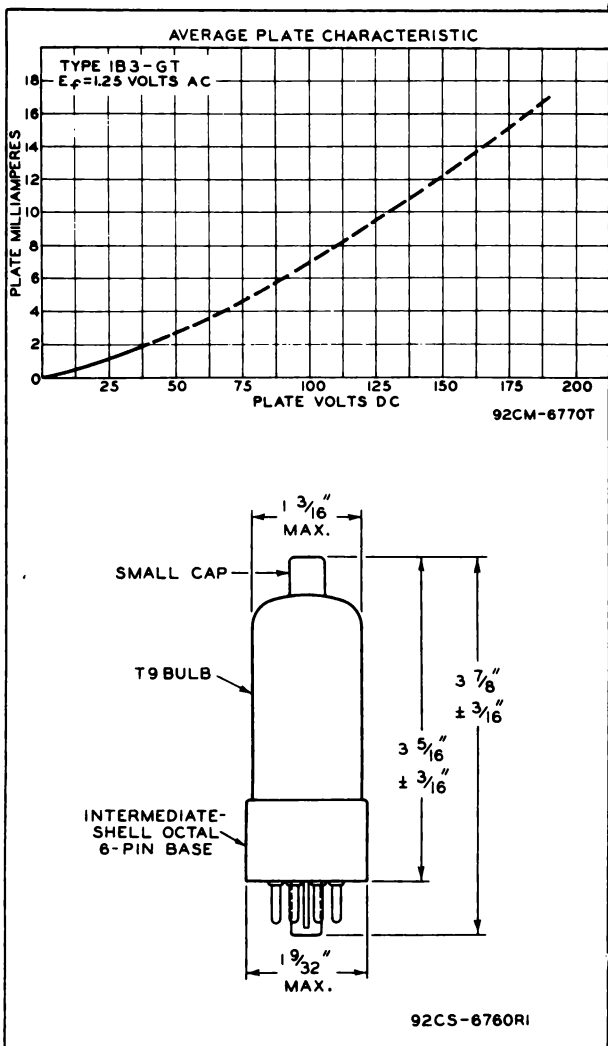
DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

IB3-GT



IB3-GT HALF-WAVE VACUUM RECTIFIER





IB4-P



IB4-P

R-F AMPLIFIER PENTODE

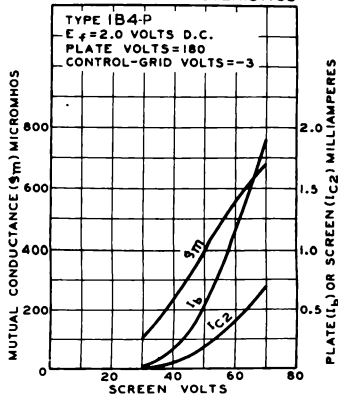
Filament	Coated	
Voltage	2.0	d-c volts
Current	0.060	amp.
Direct Interelectrode Capacitances:		
Grid to Plate (with shield-can)	0.007 max.	μf
Input	5	μf
Output	11	μf
Overall Length	4-9/32" to 4-17/32"	
Maximum Diameter	1-9/16"	
Bulb	ST-12	
Cap	Small Metal	
Base	Small 4-Pin	
Pin 1-Filament +	Pin 4-Filament -	
Pin 2-Plate	Cap -Grid	
Pin 3-Screen		

BOTTOM VIEW

AMPLIFIER - Class A**Operating Conditions and Characteristics:**

Filament	2.0	2.0	d-c volts.
Plate	90	180 max.	volts
Screen	67.5	67.5 max.	volts
Grid	-3	-3	volts
Amp. Fact.	550	1000	
Plate Res.	1.0	1.5	megohms
Mut. Cond.	600	650	μmhos
Grid Bias†	-8	-8	volts
Plate Cur.	1.6	1.7	ma.
Screen Cur.	0.7	0.6	ma.

† For plate current cut-off.

AVERAGE CHARACTERISTICS

92C-4659

SEPT. 30, 1936

RCA RADIODEN DIVISION
RCA MANUFACTURING COMPANY, INC.

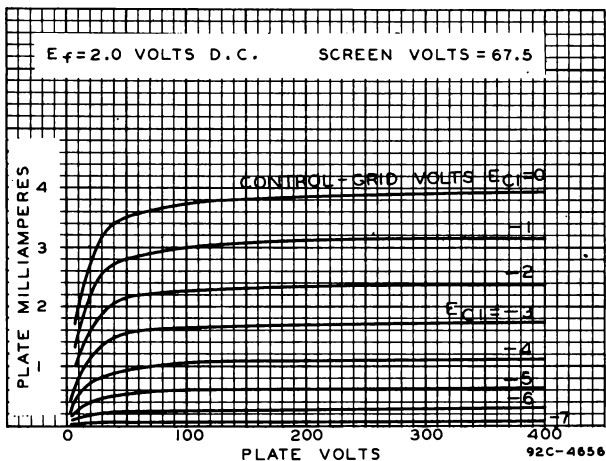
TENTATIVE DATA

1B4-P

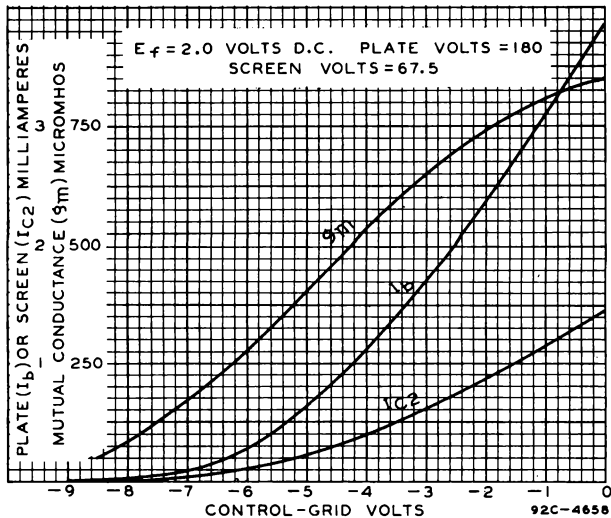


1B4-P

AVERAGE PLATE CHARACTERISTICS



AVERAGE CHARACTERISTICS





IC5-GT



IC5-GT/IC5-G

POWER AMPLIFIER PENTODE

Filament	Coated	
Voltage	1.4	d-c volts
Current	0.10	amp.
Maximum Overall Length		3-5/16"
Maximum Seated Height		2-3/4"
Maximum Diameter		1-5/16"
Bulb		T-9
Base	Intermediate Shell Octal 7-Pin	
Pin 1 - No Connection	Pin 5 - Grid	
Pin 2 - Filament +	Pin 7 - Filament -	
Pin 3 - Plate	Pin 8 - No Connection	
Pin 4 - Screen		
Mounting Position		Any



BOTTOM VIEW (G-6X)

AMPLIFIER

Plate Voltage	110 max.	volts
Screen Voltage	110 max.	volts
Total Zero-Sig. Cathode Current	12 max.	ma.
<i>Typical Operation and Characteristics - Class A₁ Amplifier:</i>		
Plate	83	90 volts
Screen	83	90 volts
Grid *	-7.0	-7.5 volts
Peak A-F Grid Volt.	7.0	7.5 volts
Zero-Sig. Plate Cur.	7.0	7.5 ma.
Max.-Sig. Plate Cur.	7.3	7.8 ma.
Zero-Sig. Screen Cur.	1.6	1.6 ma.
Max.-Sig. Screen Cur.	3.5	3.5 ma.
Plate Res.	110000	115000 approx. ohms
Transcond.	1500	1550 μ mhos
Load Res.	9000	8000 ohms
Total Harmonic Dist.	10	%
Max.-Sig. Power Output	200	240 inw

* Self-bias is recommended so that grid bias will be proportionately less as the B-supply voltage falls off during battery life.

May 1, 1941

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

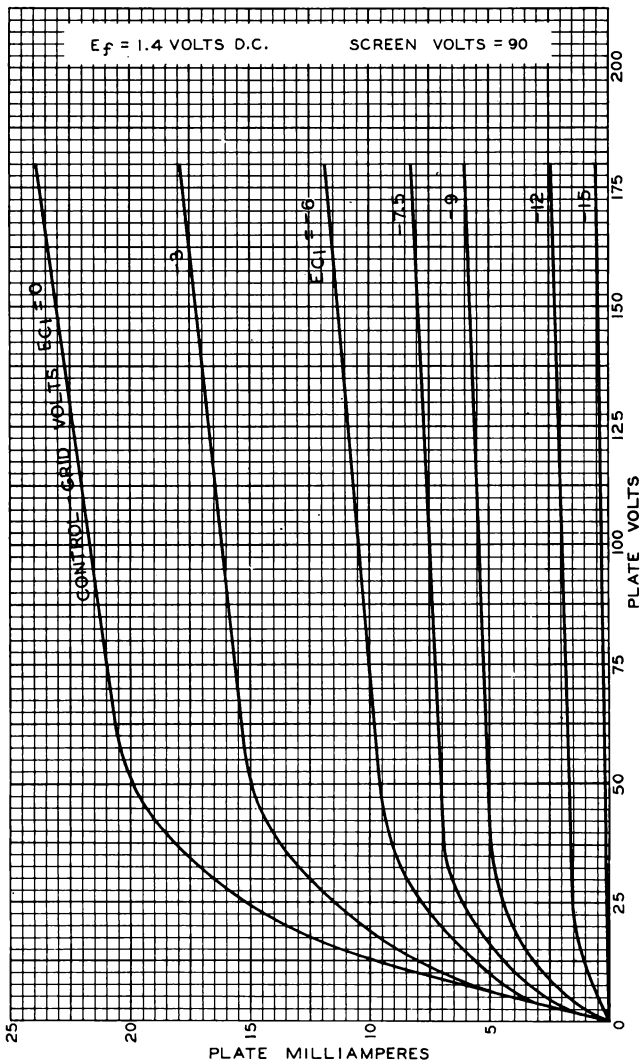
TENTATIVE DATA

1C5-GT



1C5-GT

AVERAGE PLATE CHARACTERISTICS



NOV. 10, 1938

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-4997



IC7-G
ID5-GP

IC7-G PENTAGRID CONVERTER

Filament	Coated	
Voltage	2.0	d-c volts
Current	0.120	amp.
Direct Interelectrode Capacitances: ^o		
Grid #4 to Plate	0.26	μuf ←
Grid #4 to Grid #2	0.32	μuf
Grid #4 to Grid #1	0.11	μuf
Grid #1 to Grid #2	1.2	μuf
Grid #4 to All Other Electrodes (R-F Input)	10	μuf
Grid #2 to All Other Electrodes Except Grid #1 (Osc. Output)	5.5	μuf
Grid #1 to All Other Electrodes Except Grid #2 (Osc. Input)	4.8	μuf
Plate to All Other Electrodes (Mixer Output)	14	μuf ←
Overall Length	4-7/32" to 4-15/32"	
Seated Height	3-21/32" to 3-29/32"	
Maximum Diameter	1-9/16"	
Bulb	ST-12	
Cap	Skirted Miniature	
Base	Small Shell Octal 8-Pin	
Pin 1—No Connection	Pin 6—Grid #2	
Pin 2—Filament +	Pin 7—Filament -	
Pin 3—Plate	Pin 8—No Connection	
Pin 4—Grids #3 & #5	Cap -Grid #4	
Pin 5—Grid #1		
Mounting Position	BOTTOM VIEW (G-7Z)	Vertical, Base Down [◇]



[◇] Horizontal operation permitted if pins 2 and 7 are in vertical plane.
^o with close-fitting shield connected to negative filament terminal.
 ← Indicates a change.

Maximum Ratings, Typical Operating Conditions and Curves for Type IC7-G are the same as for Type IC6.

ID5-GP SUPER-CONTROL R-F AMPLIFIER PENTODE

Filament	Coated	
Voltage	2.0	d-c volts
Current	0.060	amp.
Overall Length	4-7/32" to 4-15/32"	
Seated Height	3-21/32" to 3-29/32"	←
Maximum Diameter	1-9/16"	
Bulb	ST-12	
Cap	Skirted Miniature	
Base	Small Shell Octal 7-Pin	
Pin 1—No Connection	Pin 5—No Connection	
Pin 2—Filament +	Pin 7—Filament -	
Pin 3—Plate	Pin 8—No Connection	
Pin 4—Screen	Cap -Grid	
Mounting Position	BOTTOM VIEW (G-5Y)	Vertical, Base Down [◇]



[◇] Horizontal operation permitted if pins 2 and 7 are in vertical plane.
 ← Indicates a change.

Operating Conditions and Curves for Type ID5-GP are the same as for Type 1A4-P.

May 1, 1941

RCA RADIOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

DATA

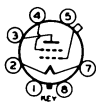
1D5-GT
1D7-G



1D5-GT

SUPER-CONTROL R-F AMPLIFIER TETRODE

Filament	Coated	
Voltage	2.0	d-c volts
Current	0.060	amp.
Overall Length		4-7/32" to 4-15/32"
Seated Height		3-21/32" to 3-29/32"
Maximum Diameter		1-9/16"
Bulb		ST-12
Cap		Skirted Miniature
Base		Small Shell Octal 7-Pin
Pin 1 - No Connection		Pin 5 - No Connection
Pin 2 - Filament +		Pin 7 - Filament -
Pin 3 - Plate		Pin 8 - No Connection
Pin 4 - Screen		Cap - Grid
Mounting Position	BOTTOM VIEW (G-5R)	Vertical $\diamond$



AMPLIFIER

Typical Operation and Characteristics - Class A₁ Amplifier:

Plate	135	180	volts
Screen	67.5	67.5	volts
Grid	-3	-3	volts
Plate Res.	0.35	0.6	approx. megohm
Transcond.	625	650	μ mhos
Grid Bias for			
Transcond. = 15 μ mhos	-15	-15	volts
Plate Cur.	2.2	2.2	ma.
Screen Cur.	0.7	0.7	ma.

$\diamond$ Horizontal operation permitted if pins 2 and 7 are in vertical plane.



1D7-G

PENTAGRID CONVERTER

Filament	Coated	
Voltage	2.0	d-c volts
Current	0.060	amp.
Overall Length		4-7/32" to 4-15/32"
Seated Height		3-21/32" to 3-29/32"
Maximum Diameter		1-9/16"
Bulb		ST-12
Cap		Skirted Miniature
Base		Small Shell Octal 8-Pin
Pin 1 - No Connection		Pin 6 - Grid #2
Pin 2 - Filament +		Pin 7 - Filament -
Pin 3 - Plate		Pin 8 - No Connection
Pin 4 - Grids #3 & #5		Cap - Grid #4
Pin 5 - Grid #1		
Mounting Position	BOTTOM VIEW (G-7Z)	Vertical, Base Down $\diamond$



For curve and additional data, refer to Type 1A8. The 1D7-G and the 1A8 are identical electrically.

$\diamond$ Horizontal operation permitted if pins 2 and 7 are in vertical plane.

$\leftarrow$ Indicates a change.

May 1, 1941

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

TENTATIVE DATA



1D8-GT



1D8-GT

DIODE-TRIODE-POWER AMPLIFIER PENTODE

Filament	Coated	
Voltage	1.4	d-c volts
Current	0.1	amp.
Maximum Overall Length		3-5/16"
Maximum Seated Height		2-3/4"
Maximum Diameter		1-5/16"
Bulb		T-9
Cap	Skirted Miniature - Style C	
Base	Intermediate Shell Octal 8-Pin	
Pin 1 - No Connection		Pin 6 - Triode Plate
Pin 2 - Filament +		Pin 7 - Filament -
Pin 3 - Pentode Plate		Pin 8 - Diode Plate
Pin 4 - Pentode Screen		Cap - Triode Grid
Pin 5 - Pentode Grid		
Mounting Position		Any



BOTTOM VIEW (G-8AJ)

TRIODE UNIT

Plate Voltage		110 max.	volts
<i>Typical Operation and Characteristics - Class A₁ Amplifier:</i>			
Plate Voltage	45	67.5	90 volts
Grid Voltage	0	0	0 volts
Amplification Factor	25	25	25
Plate Resistance	77000	55500	43500 approx. ohms
Transconductance	325	450	575 μ hos
Plate Current	0.3	0.6	1.1 ma.

PENTODE UNIT

Plate Voltage		110 max.	volts
Screen Voltage		110 max.	volts
Total Zero-Sig. Cathode Current		6 max.	ma.
<i>Typical Operation and Characteristics - Class A₁ Amplifier:</i>			
Plate Voltage	45	62.5	67.5 90 volts
Screen Voltage	45	62.5	67.5 90 volts
Grid Voltage	-4.5	-5	-6 -9 volts
Peak A-F Grid Volt.	4.5	5	6 9 volts
Plate Current	1.6	3.8	3.8 5 ma.
Screen Current	0.3	0.8	0.8 1.0 ma.
Plate Resistance	0.3	0.2	0.2 0.2 approx. megohm
Transconductance	650	875	875 925 μ hos
Load Resistance	20000	16000	16000 12000 ohms
Total Harmonic Dist.	10	10	10 10 %
Power Output	35	90	100 200 mw.

DIODE UNIT

The diode is located at the negative end of the filament, and is independent of the triode unit and of the pentode unit except for the common filament.

← Indicates a change.

Sept. 2, 1941

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

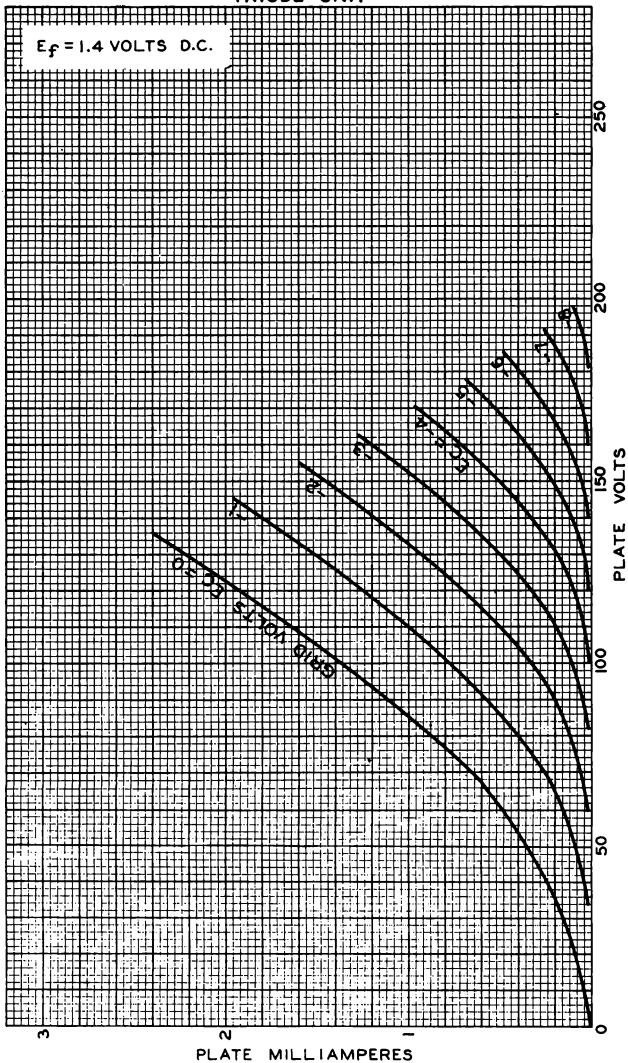
DATA

ID8-GT



ID8-GT

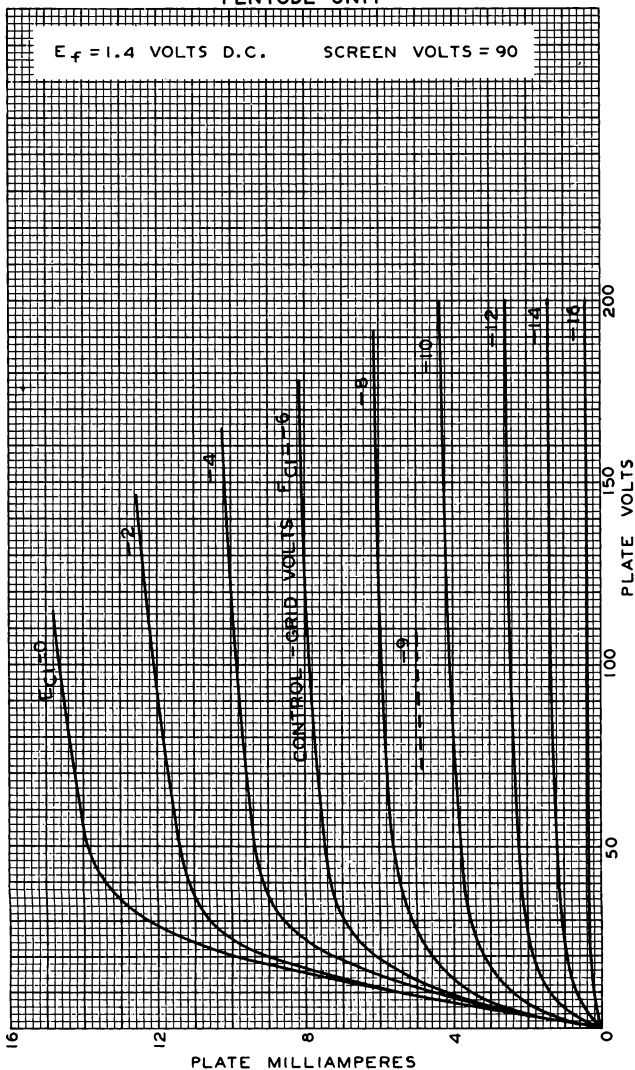
AVERAGE PLATE CHARACTERISTICS TRIODE UNIT





ID8-GT

ID8-GT AVERAGE PLATE CHARACTERISTICS PENTODE UNIT



JUNE 9, 1939

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6059



IE 8

PENTAGRID CONVERTER

SUBMINIATURE TYPE

GENERAL DATA

Electrical:

Filament, Coated:

Voltage	1.25	dc volts
Current	0.04	amp

Direct interelectrode Capacitances:^o

Grid No.3 to All Other Electrodes (RF Input).	6	$\mu\mu\text{f}$
Plate to All Other Electrodes (Mixer Input) .	5	$\mu\mu\text{f}$
Grid No.1 to All Other Electrodes (Osc. Input)	2.4	$\mu\mu\text{f}$
Grid No.3 to Plate . . .	0.4 max.	$\mu\mu\text{f}$
Grid No.3 to Grid No.1 .	0.2 max.	$\mu\mu\text{f}$

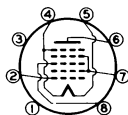
^o With no external shield.

Mechanical:

Mounting Position	Any
Maximum Overall Length	1-3/4"
Maximum Seated Length	1-1/2"
Length, Base Seat to Bulb Top (excluding tip)	1.200" $\pm$ 0.060"
Maximum Diameter	0.4"
Bulb	T-3
Base	Small-Button Sub-miniar 8-Pin

BOTTOM VIEW

- Pin 1 - Internal Connection-Do Not Use
Pin 2 - Grid No.1
Pin 3 - No Connection



- Pin 4 - Filament (-), Grid No.5
Pin 5 - Filament (+)
Pin 6 - Plate
Pin 7 - Grid No.2, Grid No.4
Pin 8 - Grid No.3

CONVERTER

Maximum Ratings, Design-Center Values:

PLATE VOLTAGE	67.5	max.	volts
GRIDS-No.2 & No.4 (SCREEN) VOLTAGE . . .	45	max.	volts
GRIDS-No.2 & No.4 SUPPLY VOLTAGE	67.5	max.	volts
TOTAL CATHODE CURRENT	4.0	max.	ma

Characteristics — Separate Excitation:*

Plate Voltage	30	45	67.5	volts
Grids-No.2 & No.4 Supply Voltage	30	45	67.5	volts
Grids-No.2 & No.4 Resistor . . .	10000	15000	20000	ohms

* The characteristics shown under separate excitation approximate those obtained in a self-excited oscillator operating with zero bias.

IE8



IE8

PENTAGRID CONVERTER

Grid-No.3 (Control-Grid)			
Voltage	0	0	0 volts
Grid-No.1 (Oscillator-Grid)			
Resistor	0.1	0.1	0.1 megohm
Plate Resistance (Approx.)	0.3	0.4	0.4 megohm
Conversion Transconductance	115	140	150 μ mhos
Grid-No.3 Voltage (Approx.)			
for conversion transconductance			
of 5 μ mhos	-7	-8	-9 volts
Plate Current	0.3	0.6	1.0 ma
Grids-No.2 & No.4 Current	0.8	1.1	1.5 ma
Grid-No.1 Current	30	50	70 μ amp
Total Cathode Current	1.1	1.7	2.5 ma

NOTE: The transconductance between grid No.1 and grids No.2 & No.4 connected to plate (not oscillating) is approximately 730 micromhos under the following conditions: signal applied to grid No.1 at zero bias; grids No.2 & No.4 and plate at 30 volts; and grid No.3 grounded. Under the same conditions, the total cathode current is 3 milliamperes and the amplification factor is 3.9.

SEPT. 15, 1949

TUBE DEPARTMENT

TENTATIVE DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



1E8

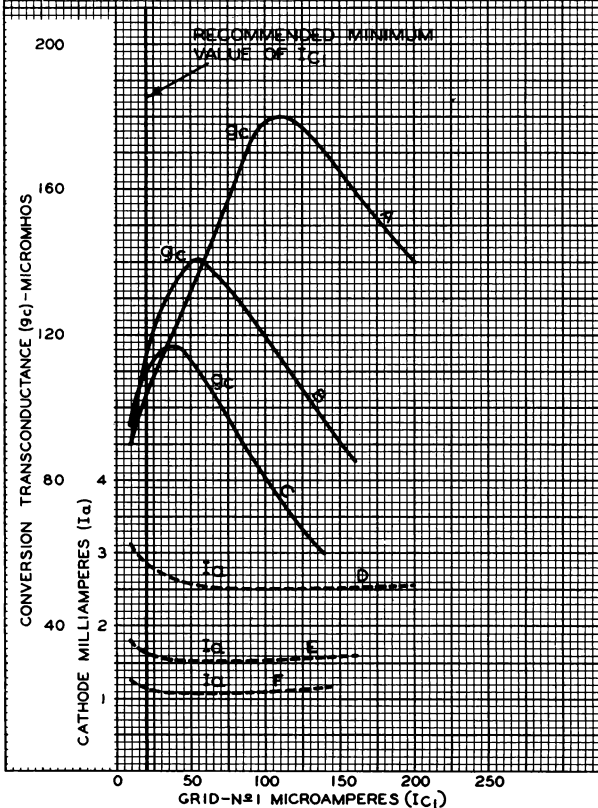
1E8

OPERATION CHARACTERISTICS WITH SEPARATE OSCILLATOR EXCITATION

 $E_f = 1.25$ VOLTS DC

CURVE	PLATE VOLTS	GRIDS N° 2 & N° 4		GRID-N° 1 RESISTOR MEGOHMS
		SUPPLY VOLTS [□]	SERIES RESISTOR OHMS	
A, D	67.5	67.5	20000	0.1
B, E	45	45	15000	0.1
C, F	30	30	10000	0.1

[□] APPLIED THROUGH SERIES RESISTOR OF
VALUE INDICATED



JAN. 24, 1949

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7165

1E8



1E8

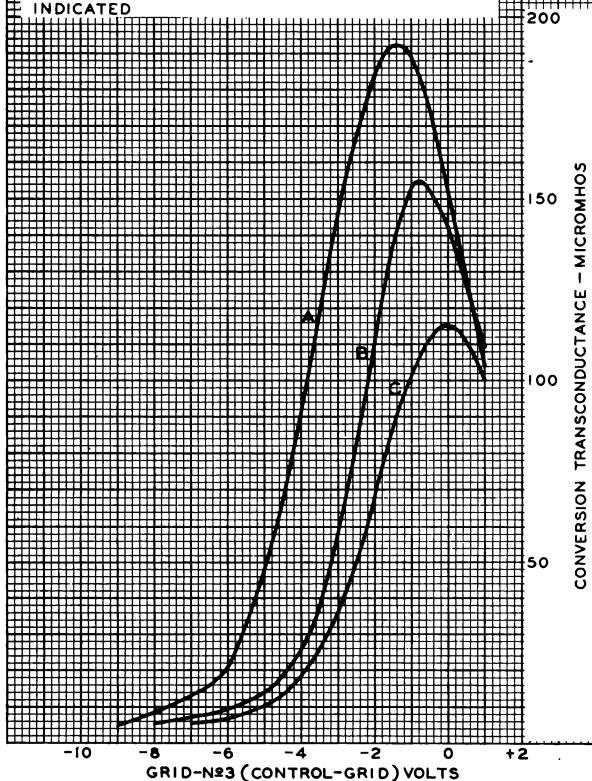
OPERATION CHARACTERISTICS WITH SEPARATE OSCILLATOR EXCITATION

E_f=1.25 VOLTS D C

CURVE	PLATE VOLTS	GRIDS N ^o 2 & N ^o 4		GRID-N ^o 1 RESISTOR MEGOHMS	GRID-N ^o 1 CURRENT μAMP*
		SUPPLY VOLTS ^o	SERIES RESISTOR OHMS		
A	30	30	10000	0.1	30
B	45	45	15000	0.1	50
C	67.5	67.5	20000	0.1	70

*OBTAINED BY ADJUSTMENT OF OSCILLATOR GRID VOLTAGE TO GIVE INDICATED VALUES

^oAPPLIED THROUGH SERIES RESISTOR OF VALUE INDICATED



JAN. 25, 1949

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7166



IH5-GT/G

IH5-GT/G

DIODE HIGH-MU TRIODE

Filament	Coated	
Voltage	1.4	a-c or d-c volts
Current	0.05	amp.

Direct Interelectrode Capacitances (Approx.):^oTriode Unit

Grid to Plate	1.0	μf
Grid to Filament	1.1	μf
Plate to Filament	4.6	μf

Maximum Overall Length 3-5/16"

Maximum Seated Height 2-3/4"

Maximum Diameter 1-5/16"

Bulb T-9

Cap Skirted Miniature

Base Sm. Wafer Octal 7-Pin, Sleeve

Pin 1 - Base Sleeve

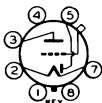
Pin 2 - Filament +

Pin 3 - Triode Plate

Pin 4 - No Connection

Pin 5 - Diode Plate

Mounting Position



Pin 7 - Filament -

Diode Shield

Pin 8 - No Connection

Cap - Triode Grid

Any

BOTTOM VIEW (GT-5Z)

*Maximum Ratings Are Design-Center Values*TRIODE UNIT

Plate Voltage 110 max. volts

Characteristics - Class A₁ Amplifier:

Plate 90 volts

Grid 0 volts

Amp. Fact. 65

Plate Res. 240000 ohms

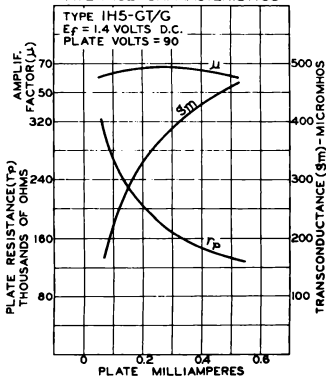
Transcond. 275 μmhos

Plate Cur. 0.15 ma.

DIODE UNIT

The diode is located at the negative end of the filament, and is independent of the triode unit except for the common filament.

^o With external shield connected to negative filament terminal.

AVERAGE CHARACTERISTICS

← Indicates a change.

Jan. 1, 1943

RCA VICTOR DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

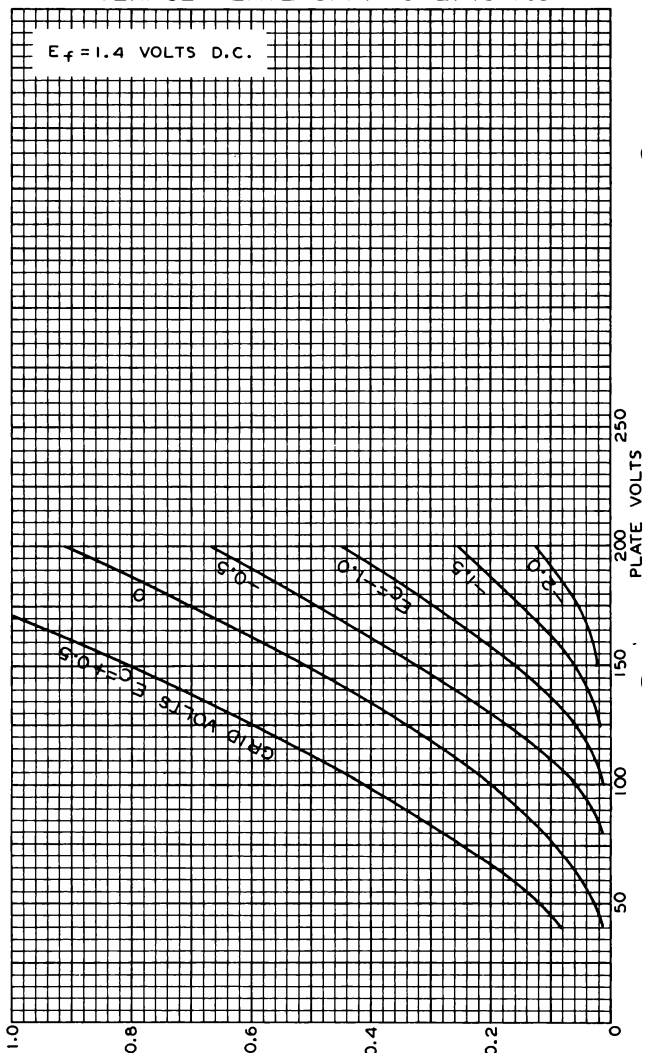
DATA

1H5-GT/G



1H5-GT/G

AVERAGE PLATE CHARACTERISTICS





IK3

IK3

HALF-WAVE VACUUM RECTIFIER

GENERAL DATA

Electrical:

Filament, Coated:

Voltage* 1.25 ac volts

Current 0.2 amp

Direct Interelectrode Capacitance (Approx.):^o

Plate to filament and internal shield . . . 1.6 μ f

Mechanical:

Operating Position. Any

Maximum Overall Length. 3-9/16"

Seated Length 2-13/16" $\pm$ 3/16"

Maximum Diameter. 1-9/32"

Bulb. T9

Cap. Small with Tubular Support (JEDEC No.C1-34)

Base. Intermediate-Shell Octal 6-Pin,

Arrangement 1 (JEDEC No.B6-8), or

Short Intermediate-Shell Octal 6-Pin

with External Barriers, Arrangement 1 (JEDEC No.B6-60)

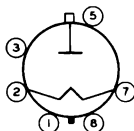
Basing Designation for BOTTOM VIEW. 3C

Pin 1 - Internal Con-
nection—
Do Not Use[■]

Pin 2 - Filament

Pin 3 - Same as Pin 1

Pin 5 - Same as Pin 1



Pin 7 - Filament,
Internal
Shield

Pin 8 - Same as Pin 1
Cap - Plate

PULSED-RECTIFIER SERVICE

Maximum Ratings, Design-Maximum Values:

For operation in a 525-line, 30-frame system[□]

INVERSE PLATE VOLTAGE:

Total dc and peak* 26000 max. volts

DC. 22000 max. volts

PEAK PLATE CURRENT. 50 max. ma

DC PLATE CURRENT. 0.5 max. ma

Characteristics:

DC Plate Voltage. 225 volts

DC Plate Current. 7 ma

* Under no circumstances should the filament voltage be less than 1.05 volts or more than 1.45 volts.

^o Without external shield.

[■] See Operating Considerations.

[□] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission.

[®] The duration of the voltage pulse must not exceed 15 per cent of one horizontal scanning cycle. In a 525-line, 30-frame system, 15 per cent of one horizontal scanning cycle is 10 microseconds.

1K3



1K3

HALF-WAVE VACUUM RECTIFIER

OPERATING CONSIDERATIONS

Socket Connections. Socket terminals Nos. 1, 3, 4, 5, 6, and 8 may be connected to socket terminal No. 7 or to a corona shield which is connected to socket terminal No. 7. Socket terminals Nos. 4 and 6 may be used as tie points for components at or near filament potential.

Measurement of Filament Voltage. To measure the filament voltage when the filament is at a high dc potential with respect to ground, it is recommended that a simple method utilizing visual comparison of the filament temperature be used. The color temperature of the filament, operating from a pulse- or rf-power source, may be checked by observing in a darkened room the reflection of the incandescent filament upon the surface of the internal shield. A visual comparison of this color temperature with that obtained when the filament of another 1K3 is operated from a dc or low-frequency ac supply of 1.25 volts, provides a convenient means for adjusting the amount of excitation to produce 1.25 volts (rms) at the filament terminals.

The high voltages at which the 1K3 is operated are very dangerous. Great care should be taken in the design of apparatus to prevent the operator from coming in contact with these high voltages. Particular care against fatal shock should be taken in the measurement of filament voltage. Under all circumstances, circuit parts which may be at high potentials should be enclosed or adequately insulated.

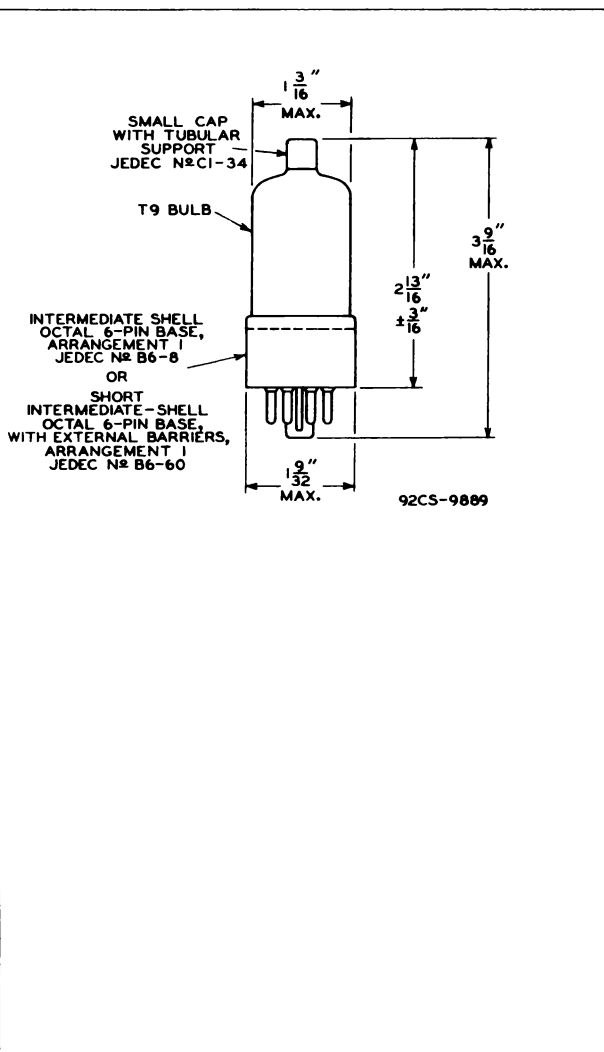
X rays. The voltages employed in some television receivers and other high-voltage equipment are sufficiently high that high-voltage rectifier tubes may produce X rays which can constitute a health hazard unless such tubes are adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.



1K3

1K3

HALF-WAVE VACUUM RECTIFIER





IL4

IL4

R-F AMPLIFIER PENTODE

MINIATURE TYPE

Filament	Coated	
Voltage	1.4	d-c volts
Current	0.05	amp.
Direct Interelectrode Capacitances: ^o		
Grid to Plate	0.008 max.	μf
Input	3.6	μf
Output	7.5	μf
Maximum Overall Length		2-1/8"
Maximum Seated Height		1-7/8"
Maximum Diameter		3/4"
Bulb		T-5-1/2
Base [▲]		Miniature Button 7-Pin
Pin 1 { Filament - Internal Shield		Pin 5 { Filament - Internal Shield
Pin 2 - Plate		Pin 6 - Grid
Pin 3 - Screen		Pin 7 - Filament +
Pin 4 - No Connection		
RCA Socket		Stock No. 9914
Mounting Position		Any



BOTTOM VIEW (6AR)

*Maximum And Minimum Ratings Are Design-Center Values*AMPLIFIER

Plate Voltage		110 max. volts
Screen Voltage		90 max. volts
Screen Supply Voltage		110 max. volts
Grid Voltage		0 min. volts
Total Cathode Current		6.5 max. ma.
<i>Typical Operation and Characteristics - Class A₁ Amplifier</i>		
Plate Voltage	90	90 volts
Screen Voltage	67.5	90 volts
Grid Voltage	0	0 volts
Plate Resistance	0.6	0.35 megohm
Transconductance	925	1025 μmhos
Grid Bias for		
Plate Current $\approx$ 10 $\mu\text{amp.}$	-6	-8 volts
Plate Current	2.9	4.5 ma.
Screen Current	1.2	2.0 ma.

^o With no external shield.

[▲] The center hole in sockets designed for this base provides for the possibility that this tube type may be manufactured with the exhaust-tube tip at the base end. For this reason, it is recommended that in equipment employing this tube type, no material be permitted to obstruct the socket hole.

June 1, 1942

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

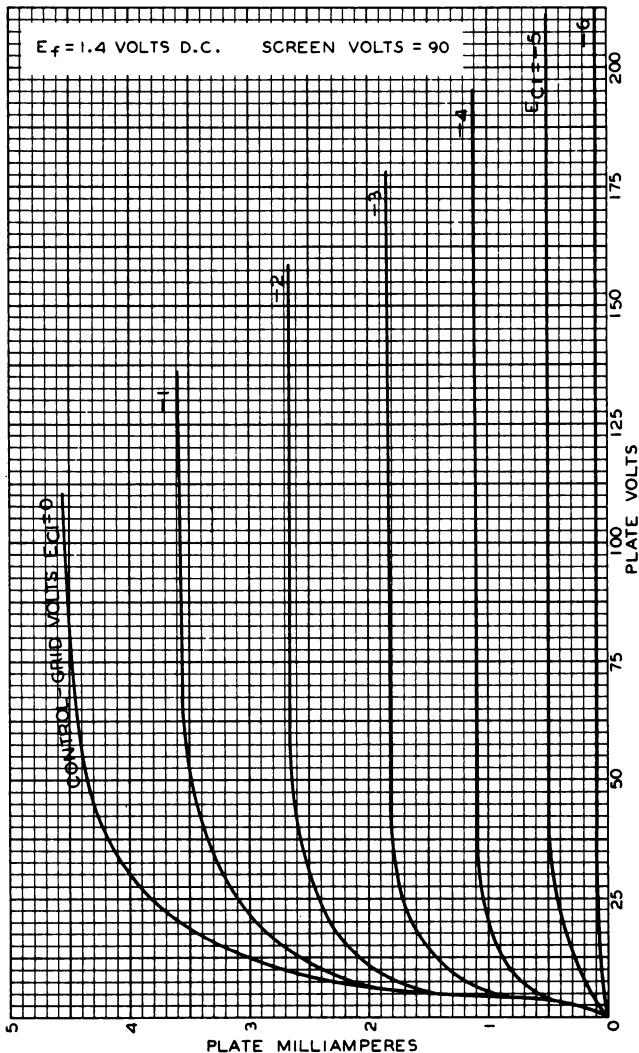
TENTATIVE DATA

IL4



IL4

AVERAGE PLATE CHARACTERISTICS



MARCH 18, 1942

RCA RADIODRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6382



IL6

PENTAGRID CONVERTER

MINIATURE TYPE

GENERAL DATA

Electrical:

Filament, Coated:

Voltage 1.4 dc volts

Current 0.050 amp

Direct Interelectrode Capacitances:

	With External Shield [▲]	Without External Shield	
Grid No.4 to All Other Electrodes (RF Input) . . .	7.5	7.5	μf
Plate to All Other Electrodes (Mixer Output) .	12	7	μf
Grid No.1 to All Other Electrodes Except Grid No.2 (Osc. Input)	2.2	2.2	μf
Grid No.2 to All Other Electrodes Except Grid No.1 (Osc. Output).	2.6	2.6	μf
Grid No.4 to Plate	0.36 max.	0.46 max.	μf
Grid No.4 to Grid No.2 . . .	0.24	0.24	μf
Grid No.4 to Grid No.1 . . .	0.19	0.19	μf
Grid No.2 to Grid No.1 . . .	0.80	0.80	μf
Grid No.1 to Plate	0.10 max.	0.15 max.	μf

Mechanical:

Mounting Position Any

Maximum Overall Length 2-1/8"

Maximum Seated Length 1-7/8"

Length from Base Seat to

Bulb Top (excluding tip) 1-1/2" $\pm$ 3/32"

Maximum Diameter 3/4"

Bulb T-5-1/2

Base Small-Button Miniature 7-Pin (JETEC No.E7-1)

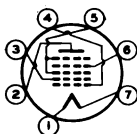
Basing Designation for BOTTOM VIEW 7DC

Pin 1-Filament (-)

Pin 2-Plate

Pin 3-Grid No.2

Pin 4-Grid No.1



Pin 5-Grid No.3,

Grid No.5

Pin 6-Grid No.4

Pin 7-Filament (+)

CONVERTER

Maximum Ratings, Design-Center Values:

PLATE VOLTAGE 110 max. volts

GRIDS-No.3 & No.5 (SCREEN) VOLTAGE 65 max. volts

[▲] External shield #316 connected to pin 1.

AUG. 1, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA

IL6



IL6

PENTAGRID CONVERTER

GRIDS-No.3 & No.5 SUPPLY VOLTAGE	110 max.	volts
GRID-No.2 (OSCILLATOR-PLATE) VOLTAGE . . .	110 max.	volts
TOTAL CATHODE CURRENT	4 max.	ma

Characteristics - Separate Excitation:†

Plate Voltage	90	volts
Grids-No.3-and-No.5 Voltage	45	volts
Grid-No.2 (Oscillator-Plate) Voltage . . .	90	volts
Grid-No.4 (Mixer-Grid) Voltage	0	volts
Grid-No.1 (Oscillator-Grid) Resistor . . .	0.2	megohm
Plate Resistance (Approx.)	0.65	megohm
Conversion Transconductance	300	μ mhos
Grid-No.4 Voltage for Conversion		
Transconductance of 10 μ mhos . . .	-3.5	volts
Grid-No.4 Voltage for Conversion		
Transconductance of 100 μ mhos . . .	-1.3	volts
Plate Current	0.5	ma
Grids-No.3-and-No.5 Current	0.6	ma
Grid-No.2 Current	1.2	ma
Grid-No.1 Current	0.035	ma
Total Cathode Current	2.35	ma

Maximum Circuit Values:

Grid-No.4-Circuit Resistance	1.0 max.	megohm
--	----------	--------

NOTE: The transconductance between grid No.1 and grid No.2 connected to plate (not oscillating) is approximately 550 μ mhos under the following conditions: signal applied to grid No.1 at zero bias; grid No.2 and plate at 90 volts; grids No.3 and No.5 at 45 volts; grid No.4 grounded. Under the same conditions, the total cathode current is 5 milliamperes, and the amplification factor is 40.

† The characteristics shown under separate excitation approximate those obtained in a self-excited oscillator operating with zero bias.

AUG. 1, 1953

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA



1LB4 POWER PENTODE

1LB4

GENERAL DATA

Electrical:

Filament, Coated:

Voltage. 1.4 dc volts
Current. 0.05 amp

Mechanical:

Mounting Position. Any
Maximum Overall Length 2-25/32"
Maximum Seated Length. 2-1/4"
Maximum Diameter 1-3/16"
Bulb T-9
Base Lock-in 8-Pin
Basing Designation for BOTTOM VIEW 5AD2

Pin 1-Filament (+)

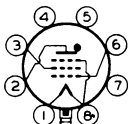
Pin 2-Plate

Pin 3-Grid No.2

Pin 4-Internal

Connection

—Do Not Use



Pin 5-No Connection

Pin 6-Grid No.1

Pin 7-No Connection

Pin 8-Filament (-),

Grid No.3

Plug -Base Shell

Maximum Ratings and Typical Operating Conditions for the 1LB4 are the same as for the Pentode Unit of Type 1D8-GT.

ILC 5



ILC 5

SHARP-CUTOFF PENTODE

GENERAL DATA**Electrical:**

Filament, Coated:

Voltage. 1.4 dc volts

Current. 0.05 amp

Direct Interelectrode Capacitances:⁰Grid No.1 to Plate 0.007 max. μmf Input. 3.2 μmf Output 7.0 μmf ⁰ With external shield connected to negative filament terminal.**Mechanical:**

Mounting Position. Any

Maximum Overall Length 2-25/32"

Maximum Seated Length. 2-1/4"

Maximum Diameter 1-3/16"

Bulb T-9

Base Lock-in 8-Pin

Basing Designation for BOTTOM VIEW 7A0

Pin 1 - Filament (+)

Pin 2 - Plate

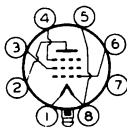
Pin 3 - Grid No.2

Pin 4 - Grid No.3

Pin 5 - Filament (-),

Internal

Shield



Pin 6 - Grid No.1

Pin 7 - No Connection

Pin 8 - Filament (-),

Internal

Shield

Plug - Base

Shell

AMPLIFIER - Class A₁**Maximum Ratings, Design-Center Values:**

PLATE VOLTAGE. 110 max. volts

GRID-No.2 (SCREEN) VOLTAGE 45 max. volts

Typical Operation and Characteristics:

Plate Voltage. 45 90 . . volts

Grid No.3. Connected to negative filament terminal at socket

Grid-No.2 Voltage. 45 45 . . volts

Grid-No.1 (Control-Grid)

Supply Voltage .

0 0 . . volts

Min. Grid-No.1 Resistor. 1 1 . . megohm

Plate Resistance (Approx.) 0.7 1.5 . . megohms

Transconductance 750 775 . . μmhos

Plate Current. 1.1 1.15 . . ma

Grid-No.2 Current. 0.35 0.30 . . ma

OCTOBER 15, 1947

TUBE DEPARTMENT

DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



ILC6

PENTAGRID CONVERTER

ILC6

GENERAL DATA**Electrical:**

Filament, Coated:

Voltage. 1.4 dc volts
 Current. 0.05 amp

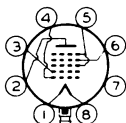
Direct Interelectrode Capacitances:⁰

Grid No.4 to Plate 0.28 $\mu\mu\text{f}$
 Mixer Input. 9.0 $\mu\mu\text{f}$
 Mixer Output 5.5 $\mu\mu\text{f}$
 Oscillator Input 2.4 $\mu\mu\text{f}$
 Oscillator Output. 4.8 $\mu\mu\text{f}$

⁰ With external shield connected to negative filament terminal.**Mechanical:**

Mounting Position. Any
 Maximum Overall Length 2-25/32"
 Maximum Seated Length. 2-1/4"
 Maximum Diameter 1-3/16"
 Bulb T-9
 Base Lock-in 8-Pin
 Basing Designation for BOTTOM VIEW 7AK

Pin 1-Filament (+)
 Pin 2-Plate
 Pin 3-Grid No.2
 Pin 4-Grid No.1
 Pin 5-Grid No.3,
 Grid No.5



Pin 6-Grid No.4
 Pin 7-No
 Connection
 Pin 8-Filament (-)
 Plug -Base Shell

CONVERTER**Maximum Ratings, Design-Center Values:**

PLATE VOLTAGE. 110 max. volts
 GRIDS-No.3 & No.5 (SCREEN) VOLTAGE 45 max. volts
 GRIDS-No.3 & No.5 SUPPLY VOLTAGE 110 max. volts
 GRID-No.2 (ANODE-GRID) VOLTAGE 50 max. volts
 GRID-No.2 SUPPLY VOLTAGE 110 max. volts
 TOTAL CATHODE CURRENT. 3.0 max. ma

Typical Operation:

Plate Voltage. 45 90 volts
 Grids-No.3 & No.5 Voltage[□] 35 35 volts
 Grid-No.2 Voltage. 45 45 volts
 Grid-No.4 (Control-Grid)
 Supply Voltage 0 0 volts
 Min. Grid-No.4 Resistor. 1 1 megohm
 Grid-No.1 (Oscillator-Grid) Resistor 0.2 0.2 megohm
 Plate Resistance 0.3 0.65 megohm
 Conversion Transconductance. 250 275 μmhos
 Conversion Transconductance (Approx.)[#] 5 5 μmhos

[□],[#]: See next page.

OCTOBER 15, 1947

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA

ILC6



ILC6

PENTAGRID CONVERTER

Plate Current.	0.70	0.75	ma
Grids-No.3 & No.5 Current.	0.75	0.70	ma
Grid-No.2 Current.	1.4	1.4	ma
Grid-No.1 Current.	0.035	0.035	ma
Total Cathode Current.	2.9	2.9	ma

□ obtained preferably by using a properly bypassed voltage-dropping resistor in series with the plate voltage supply. To avoid oscillation difficulties, the voltage of grids No.3 & No.5 must be at least 10 volts lower than the grid-No.2 voltage.

* For grid-No.4 bias of -3 volts.

NOTE: The characteristics of the oscillator section (not oscillating) are: transconductance = approx. 550 μ mhos; μ = 14; and grid-No.2 current = 2.7 ma. under the following conditions: plate volts = 90; grids No.3 & No.5 volts = 45; grid-No.4 volts = 0; grid-No.2 volts = 90; grid-No.1 volts = 0.



ILD5

ILD5

DIODE—SHARP-CUTOFF PENTODE

GENERAL DATA**Electrical:**

Filament, Coated:

Voltage. 1.4 dc volts

Current. 0.05 amp

Direct Interelectrode Capacitances:⁰**Pentode Unit:**Grid No.1 to Plate . . 0.18 μf Input. 3.2 μf Output 6.0 μf ⁰ With external shield connected to negative filament terminal.**Mechanical:**

Mounting Position. Any

Maximum Overall Length 2-25/32"

Maximum Seated Length. 2-1/4"

Maximum Diameter 1-3/16"

Bulb T-9

Base Lock-in 8-Pin

Basing Designation for BOTTOM VIEW 6AX

Pin 1—Filament (+)

Pin 2—Pentode

Plate

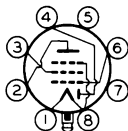
Pin 3—Pentode

Grid No.2

Pin 4—Diode Plate

Pin 5—No

Connection



Pin 6—Pentode

Grid No.1

Pin 7—No

Connection

Pin 8—Filament (-),

Pentode

Grid No.3

Plug — Base Shell

PENTODE UNIT
AMPLIFIER — Class A₁**Maximum Ratings, Design-Center Values:**

PLATE VOLTAGE. 110 max. volts

GRID-No.2 (SCREEN) VOLTAGE 50 max. volts

Typical Operation and Characteristics:

Plate Voltage. 45 90 . . . volts

Grid-No.2 Voltage. 45 45 . . . volts

Grid-No.1 Voltage. 0 0 . . . volts

Plate Resistance (Approx.) 0.9 0.75 megohm

Transconductance 550 575 μmhos

Plate Current. 0.55 0.6 . . . ma

Grid-No.2 Current. 0.12 0.1 . . . ma

DIODE UNIT

The diode is located at the negative end of the filament and is independent of the pentode unit except for the common filament.

ILE3



ILE3

MEDIUM-MU TRIODE

GENERAL DATA

Electrical:

Filament, Coated:

Voltage. 1.4 dc volts

Current. 0.05 amp

Direct Interelectrode Capacitances - Triode Unit:*

Grid to Plate. 1.7 $\mu\mu\text{f}$

Grid to Cathode. 1.7 $\mu\mu\text{f}$

Plate to Cathode. 3.0 $\mu\mu\text{f}$

* With external shield connected to negative filament terminal.

Mechanical:

Mounting Position. Any

Maximum Overall Length 2-25/32"

Maximum Seated Length. 2-1/4"

Maximum Diameter 1-3/16"

Bulb T-9

Base Lock-in 8-Pin

Basing Designation for BOTTOM VIEW 4AA

Pin 1 - Filament (+)

Pin 2 - Plate

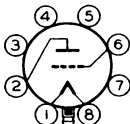
Pin 3 - No Connection

Pin 4 - No Connection

Pin 5 - Internal

Connection -

Do Not Use



Pin 6 - Grid

Pin 7 - No

Connection

Pin 8 - Filament (-)

Plug - Base

Shell

AMPLIFIER - Class A₁

Maximum Ratings, Design-Center Values:

PLATE VOLTAGE. 110 max. volts

Typical Operation and Characteristics:

Plate Voltage. 90 volts

Grid Voltage 0 volts

Amplification Factor 14.5 14.5

Plate Resistance 11200 19000 ohms

Transconductance 1300 760 μmhos

Plate Current. 4.5 1.4 ma



1LG5

1LG5

REMOTE-CUTOFF PENTODE

GENERAL DATA

Electrical:

Filament, Coated:

Voltage 1.4 dc volts

Current 0.05 amp

Direct Interelectrode Capacitances:⁰

Grid No.1 to Plate. 0.007 max. μmf

Input 3.2 μmf

Output. 7.0 μmf

⁰ With external shield connected to negative filament terminal.

Mechanical:

Mounting Position Any

Maximum Overall Length. 2-25/32"

Maximum Seated Length 2-1/4"

Maximum Diameter. 1-3/16"

Bulb. T-9

Base. Lock-in 8-Pin

Basing Designation for BOTTOM VIEW. 7A0

Pin 1-Filament(+)

Pin 2-Plate

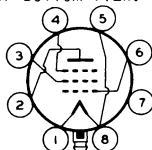
Pin 3-Grid No.2

Pin 4-Grid No.3

Pin 5-Filament(-)

Internal

Shield



Pin 6-Grid No.1

Pin 7-No Con-

nection

Pin 8-Filament(-)

Internal

Shield

Plug - Base Shell

AMPLIFIER - Class A₁

Maximum Ratings, Design-Center Values:

PLATE VOLTAGE 110 max. volts

GRID-No.2 (SCREEN) VOLTAGE. 110 max. volts

Typical Operation and Characteristics:

Plate Voltage 90 90 volts

Grid No.3 (Suppressor). } Connected to negative filament terminal at socket

Grid-No.2 Voltage 45 90 volts

Grid-No.1 (Control-Grid)

Voltage. 0 -1.5 volts

Plate Resistance (Approx.). 1.0 0.5 megohm

Transconductance. 800 1150 μmhos

Grid-No.1 Bias (Approx.) for

transconductance of 10 μmhos -10 -19 volts

Plate Current 1.7 3.7 ma

Grid-No.2 Current 0.4 0.9 ma



1LH4

DIODE - HIGH-MU TRIODE

1LH4

GENERAL DATA

Electrical:

Filament, Coated:

Voltage. 1.4 dc volts

Current. 0.05 amp

Mechanical:

Mounting Position. Any

Maximum Overall Length 2-25/32"

Maximum Seated Length. 2-1/4"

Maximum Diameter 1-3/16"

Bulb T-9

Base Lock-in 8-Pin

Basing Designation for BOTTOM VIEW 5AG

Pin 1 - Filament (+)

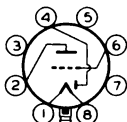
Pin 2 - Triode Plate

Pin 3 - No
Connection

Pin 4 - Diode Plate

Pin 5 - No

Connection



Pin 6 - Triode Grid

Pin 7 - No

Connection

Pin 8 - Filament (-)

Plug - Base

Shell

*Maximum Ratings and Characteristics for Type 1LH4
are the same as those shown for the 1H5-GT.*

1LN5



1LN5

SHARP-CUTOFF PENTODE

GENERAL DATA

Electrical:

Filament, Coated:

Voltage. 1.4 dc volts
Current. 0.05 amp

Direct Interelectrode Capacitances:^o

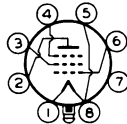
Grid No.1 to Plate . . . 0.007 max. μf
Input. 3.0 μf
Output 8.0 μf

^o With external shield connected to negative filament terminal.

Mechanical:

Mounting Position. Any
Maximum Overall Length 2-25/32"
Maximum Seated Length. 2-1/4"
Maximum Diameter 1-3/16"
Bulb T-9
Base Lock-in 8-Pin
Basing Designation for BOTTOM VIEW 7A0

Pin 1-Filament (+)
Pin 2-Plate
Pin 3-Grid No.2
Pin 4-Grid No.3
Pin 5-Filament (-)



Pin 6-Grid No.1
Pin 7-No
Connection
Pin 8-Filament (-)
Plug - Base Shell

AMPLIFIER - Class A₁

Maximum Ratings, Design-Center Values:

PLATE VOLTAGE. 110 max. volts
GRID-No.2 (SCREEN) VOLTAGE 110 max. volts

Typical Operation and Characteristics:

Plate Voltage. 90 . . . volts
Grid-No.3 (Suppressor) Connected to cathode at socket
Grid-No.2 Voltage. 90 . . . volts
Grid-No.1 (Control-Grid) Voltage 0 . . . volts
Plate Resistance (Approx.) 1.1 . . megohms
Transconductance 800 . . μmhos
Grid-No.1 Bias (Approx.) for
transconductance of 10 μmhos -4.5 . . volts
Plate Current. 1.6 . . ma
Grid-No.2 Current. 0.35 . . ma



IN5-GT/G

R-F AMPLIFIER PENTODE

IN5-GT/G

Filament	Coated	
Voltage	1.4	d-c volts
Current	0.05	amp.
Direct Interelectrode Capacitances: ^o		
Grid to Plate	0.007 max.	$\mu\mu\text{f}$
Input	3	$\mu\mu\text{f}$
Output	10	$\mu\mu\text{f}$
Maximum Overall Length		3-5/16"
Maximum Seated Height		2-3/4"
Maximum Diameter		1-5/16"
Bulb		T-9
Cap		Skirted Miniature
Base		Small Wafer Octal 7-Pin, Sleeve
Pin 1 - Base Sleeve		Pin 5 - No Connection
Pin 2 - Filament +		Pin 7 - Filament -
Pin 3 - Plate		Pin 8 - No Connection
Pin 4 - Screen		Cap - Grid
Mounting Position		Any



BOTTOM VIEW (GT-5Y)

Maximum Ratings Are Design-Center Values

AMPLIFIER

Plate Voltage	110 max.	volts
Screen Voltage	110 max.	volts
<i>Typical Operation and Characteristics - Class A₁ Amplifier:</i>		
Plate	90	volts
Screen	90	volts
Grid	0	volts
Plate Res.	1.5 approx.	megohms
Transcond.	750	μmhos
Grid Bias for Transcond.		
of approx. 5 μmhos	-4	volts
Plate Cur.	1.2	ma.
Screen Cur.	0.3	ma.

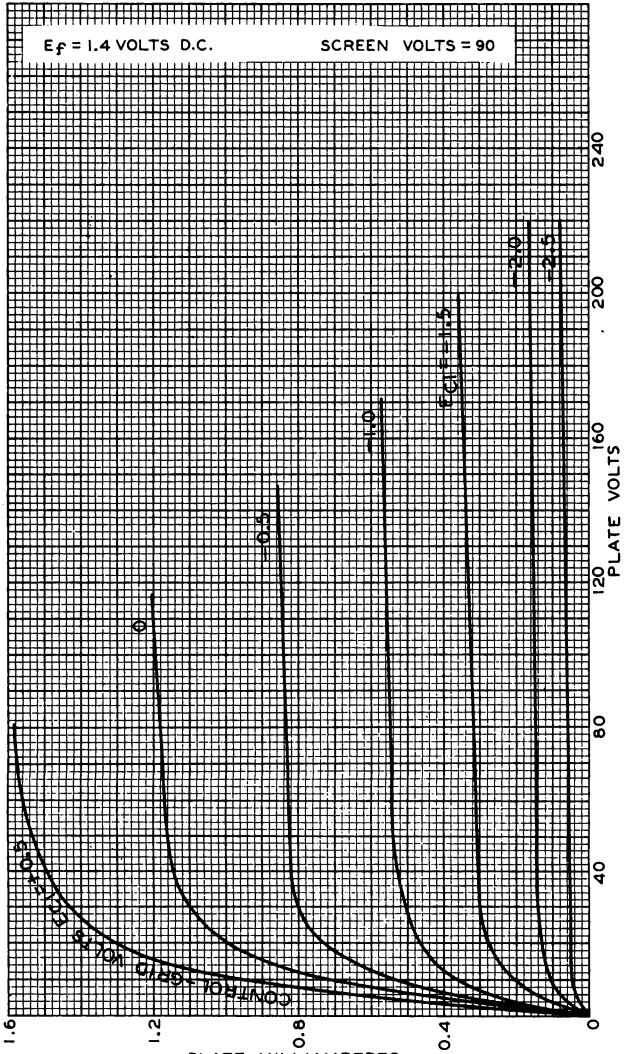
^o With shield connected to negative filament terminal.

1N5-GT/G



1N5-GT/G

AVERAGE PLATE CHARACTERISTICS



DEC. 29, 1942

PLATE MILLIAMPERES
RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

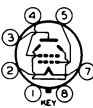
92C-6000R1



IQ5-GT/IQ5-G

BEAM POWER AMPLIFIER

IQ5-GT
★

Filament	Coated	
Voltage	1.4	d-c volts
Current	0.1	amp.
Maximum Overall Length		3-5/16"
Maximum Seated Height		2-3/4"
Maximum Diameter		1-5/16"
Bulb		T-9
Base	Intermediate Shell Octal 7-Pin	
Pin 1 - No Connection		Pin 5 - Grid
Pin 2 - Filament +		Pin 7 - Filament -
Pin 3 - Plate		Pin 8 - No Connection
Pin 4 - Screen		
Mounting Position		Any

BOTTOM VIEW (G-6AF)

AMPLIFIER

Plate Voltage	110 max.	volts
Screen Voltage	110 max.	volts
Zero-Signal Cathode Current	12 max.	ma.

Typical Operation and Characteristics - Class A₁ Amplifier:

Plate	85	90	volts
Screen	85	90	volts
Grid	-5	-4.5	volts
Peak A-F Grid Voltage	5	4.5	volts
Zero-Sig. Plate Cur.	7.0	9.5	ma.
Zero-Sig. Screen Cur.	0.8	1.3	<u>approx. ma.</u>
Plate Resistance	70000	75000	<u>approx. ohms</u>
Transconductance	1950	2200	μmhos
Load Resistance	9000	8000	ohms
Total Harmonic Dist.	5.5	6.0	%
Max.-Sig. Power Output	250	270	mw.

← Indicates a change.

July 1, 1941

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

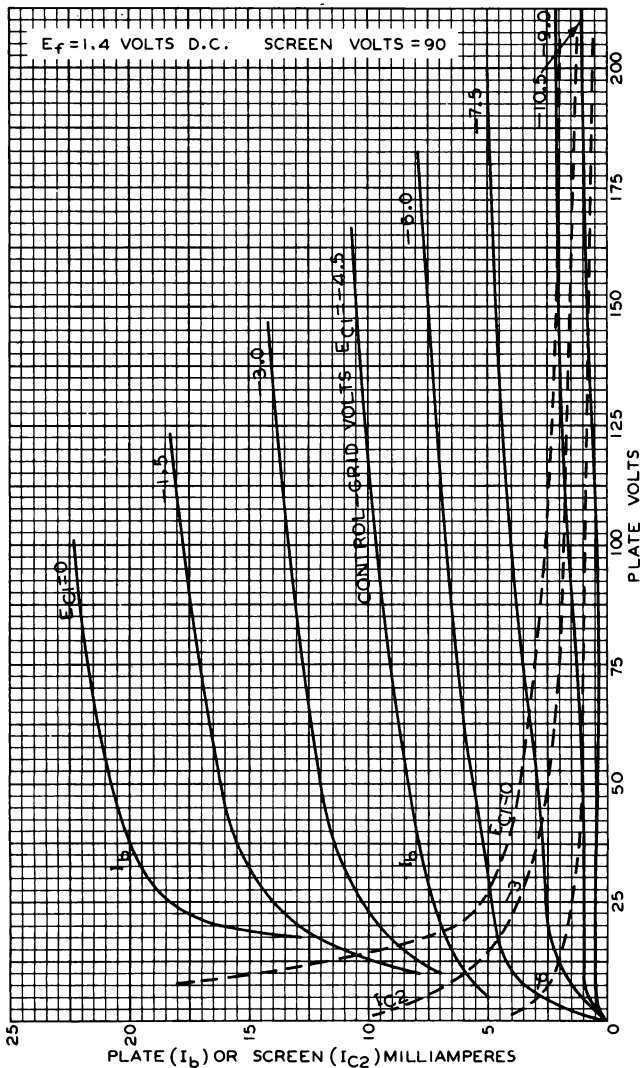
DATA

1Q5-GT



1Q5-GT

AVERAGE PLATE CHARACTERISTICS



JUNE 3, 1941

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6293



IR5

IR5

PENTAGRID CONVERTER

MINIATURE TYPE

Filament	Coated	
Voltage	1.4	d-c volts
Current	0.05	amp.

Direct Interelectrode Capacitances:^o

Grid #3 to All Other Electrodes (R-F Input)	7.0	μuf
Plate to All Other Electrodes (Mixer Output)	7.5	μuf
Grid #1 to All Other Electrodes (Osc. Input)	3.8	μuf
Grid #3 to Plate	0.4 max.	μuf
Grid #3 to Grid #1	0.2 max.	μuf
Grid #1 to Plate	0.1 max.	μuf

Maximum Overall Length

2-1/8"

Maximum Seated Height

1-7/8"

Maximum Diameter

3/4"

Bulb

T-5-1/2

Base[▲]

Pin 1 - Filament -

Pin 2 - Plate

Pin 3 - Grids #2 & #4

Pin 4 - Grid #1



Miniature Button 7- Pin

Pin 5 - Filament -

Pin 6 - Grid #3

Pin 7 - Filament +

Mounting Position

BOTTOM VIEW (7AT)

Any

Maximum and Minimum Ratings Are Design-Center Values

CONVERTER SERVICE

Plate Voltage	90 max.	volts
Grids #2 & #4 Voltage	67.5 max.	volts
Grids #2 & #4 Supply Voltage	90 max.	volts
Grid #3 Voltage	0 min.	volts
Total Zero-Sig. Cathode Current	5.5 max.	ma.

Typical Operation and Characteristics:

Plate Voltage	45	67.5	90	90	volts
Grids #2 & #4 Voltage	45	67.5	45	67.5	volts
Grid #3 Voltage	0	0	0	0	volts
Grid #1 Resistor	0.1	0.1	0.1	0.1	megohm
Plate Resistance	0.6	0.5	0.8	0.6	approx. megohm
Conversion Transcond.	235	280	250	300	μmhos
Grid #3 Bias for Conver.					
Transcond. of approx.					
5 μmhos	-9	-14	-9	-14	volts
Plate Current	0.7	1.4	0.8	1.6	ma.
Grids #2 & #4 Current	1.9	3.2	1.9	3.2	ma.
Grid #1 Current	0.15	0.25	0.15	0.25	ma.
Total Cathode Current	2.75	5	2.75	5	ma.

NOTE: The transconductance between Grid #1 and Grids #2 & #4 tied to plate (not oscillating) is approximately 1400 μmhos under the following conditions: Grid #1 & #3 at 0 volts; Grids #2 & #4 and plate at 67.5 volts.

^o With no external shield.

[▲] The center hole in sockets designed for this base provides for the possibility that this tube type may be manufactured with the exhaust-tube tip at the base end. For this reason, it is recommended that in equipment employing this tube type, no material be permitted to obstruct the socket hole.

← Indicates a change.

May 1, 1942

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

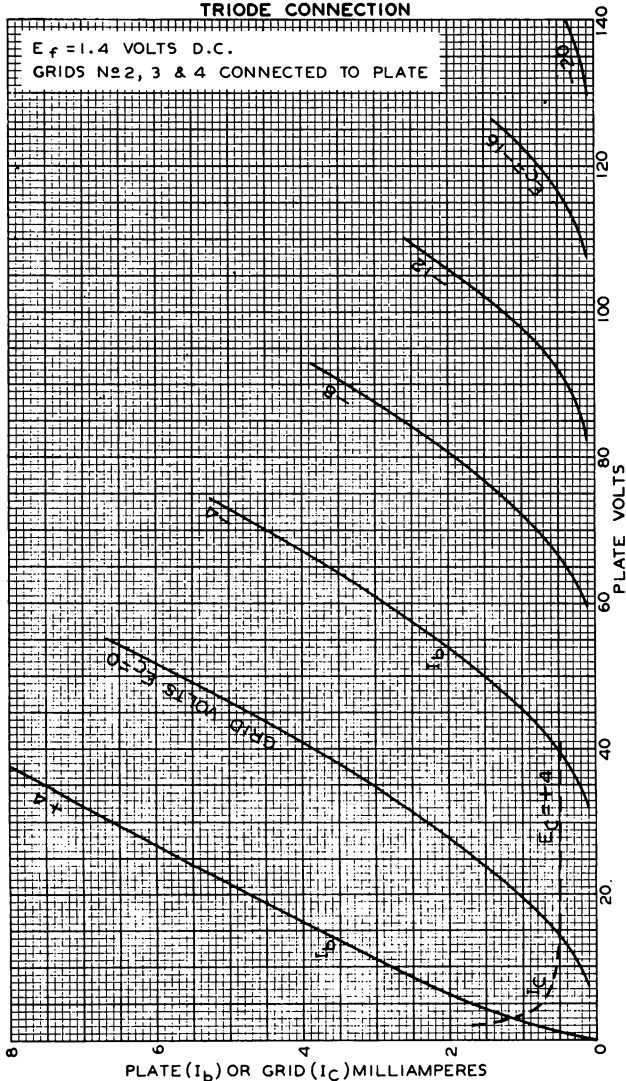
DATA

IR5



IR5

AVERAGE PLATE CHARACTERISTICS TRIODE CONNECTION



MAY 4, 1942

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

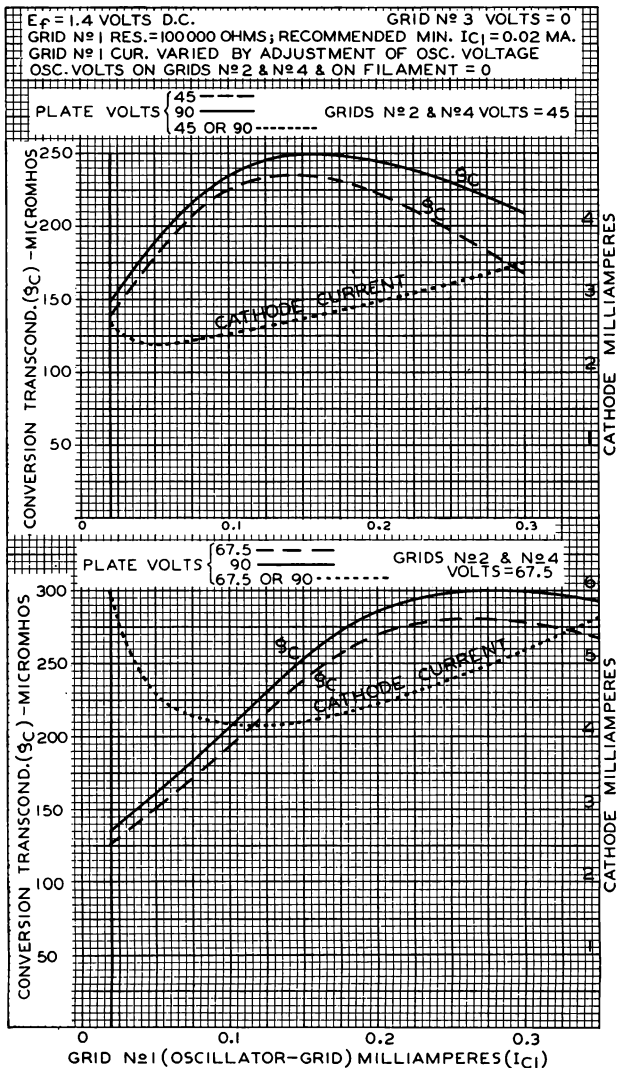
92C-6350RI



IR5

IR5

OPERATION CHARACTERISTICS



MAY 30, 1940

RCA RADIODOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6098R I

IR5



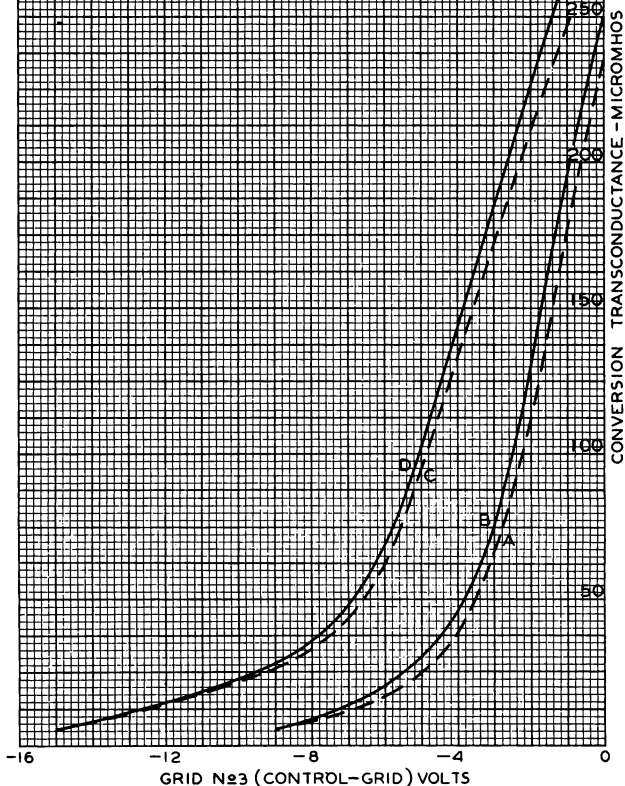
IR5

OPERATION CHARACTERISTICS

 $E_f = 1.4$ VOLTS D.C.

CURVE	PLATE VOLTS	GRID N ^o 2 & N ^o 4 VOLTS	GRID N ^o 1 RESISTOR OHMS	GRID N ^o 1 CURRENT μ A *
A	45	45	100000	150
B	90	45	100000	150
C	67.5	67.5	100000	250
D	90	67.5	100000	250

*OBTAINED BY ADJUSTMENT OF OSC.-GRID (GRID N^o1) VOLTS TO GIVE INDICATED VALUES
OSC. VOLTS ON GRIDS N^o2, & N^o4 & ON FILAMENT = 0



MAY 29, 1940

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6097R1



IS4

IS4

**POWER AMPLIFIER PENTODE**

MINIATURE TYPE

Filament	Coated	
Voltage	1.4	d-c volts
Current	0.1	amp.
Maximum Overall Length		2-1/8"
Maximum Seated Height		1-7/8"
Maximum Diameter		3/4"
Bulb		T-5-1/2
Base ^Δ		Miniature Button 7-Pin
Pin 1 - Filament -		Pin 5 - Filament -
Pin 2 - Plate		Pin 6 - Plate
Pin 3 - Grid		Pin 7 - Filament +
Pin 4 - Screen		
Mounting Position		Any



BOTTOM VIEW (7AV)

AMPLIFIER

Plate Voltage	90 max. volts
Screen Voltage	67.5 max. volts
Total Max.-Signal Cathode Current	11 max. ma.
Total Zero-Signal Cathode Current	9 max. ma.

Typical Operation and Characteristics - Class A₁ Amplifier:

Filament	1.4	1.4	1.4	d-c volts
Plate	45	67.5	90	volts
Screen	45	67.5	67.5	volts
Grid	-4.5	-7	-7	volts
Peak A-F Grid Voltage	4.5	7	7	volts
Zero-Signal Plate Cur.	3.8	7.2	7.4	ma.
Zero-Signal Screen Cur.	0.8	1.5	1.4	ma.
Plate Res. (Approx.)	0.1	0.1	0.1	megohm
Transcond.	1250	1550	1575	μmhos
Load Res.	8000	5000	8000	ohms
Total Harmonic Distortion	12	10	12	%
Max.-Sig. Power Output	65	180	270	mw

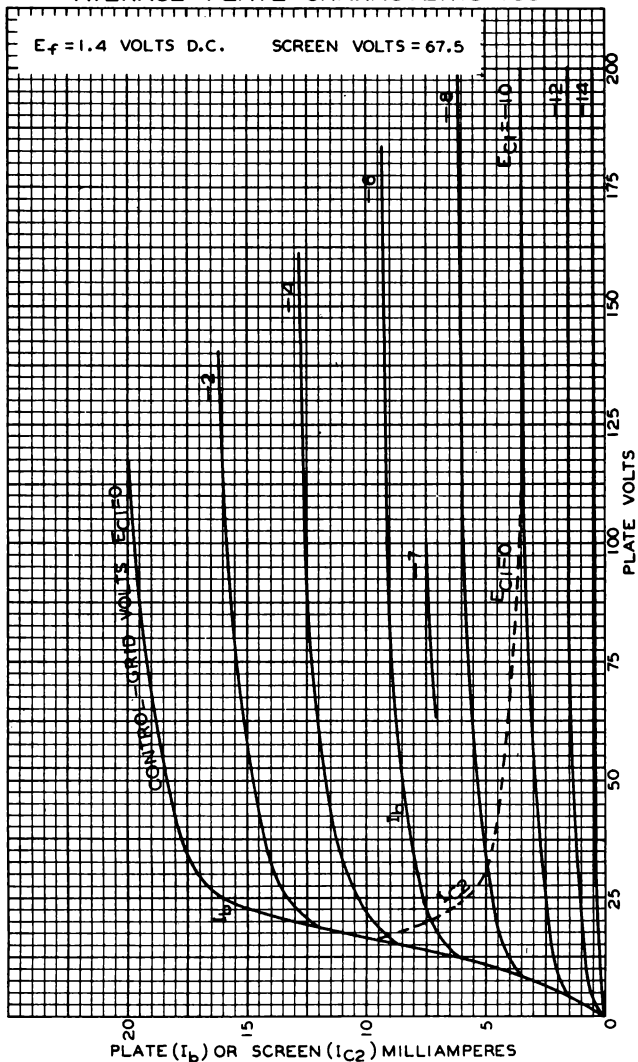
^Δ The center hole in sockets designed for this base provides for the possibility that this tube type may be manufactured with the exhaust-tube tip at the base end. For this reason, it is recommended that in equipment employing this tube type, no material be permitted to obstruct the socket hole.

154



154

AVERAGE PLATE CHARACTERISTICS



JAN. 26, 1942

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6157RI

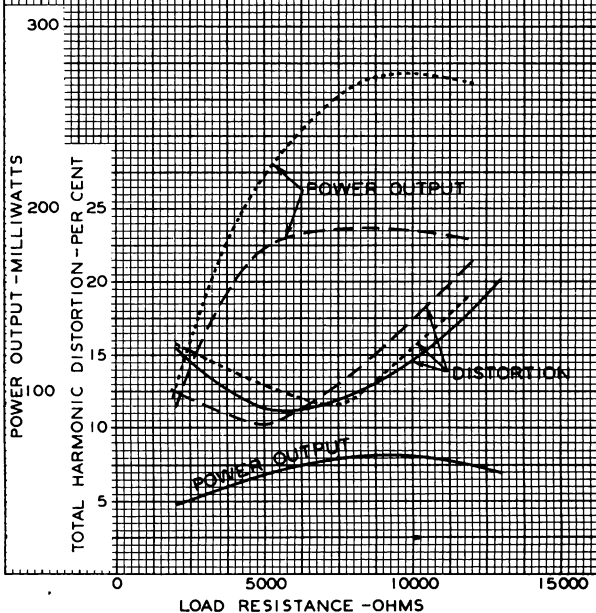


1S4

OPERATION CHARACTERISTICS

 $E_f = 1.4$ VOLTS D.C.

CURVE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	SIGNAL VOLTS RMS
—	45	45	-4.5	3.2
- - -	67.5	67.5	-7	4.95
· · · · ·	90	67.5	-7	4.95



MAY 8, 1941

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

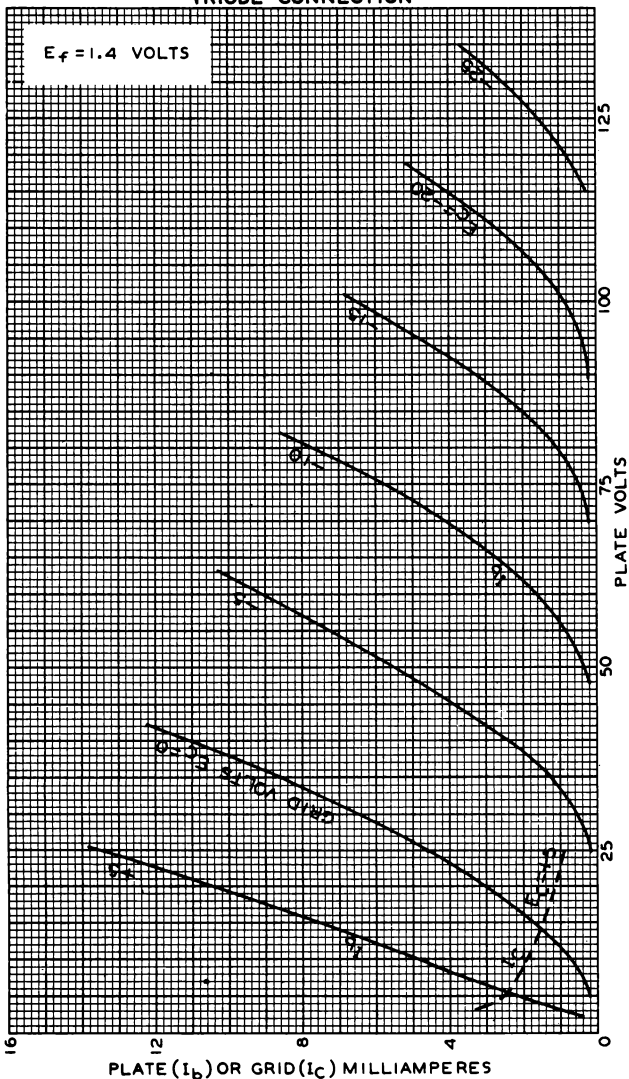
92C-6175R1

1S4



1S4

AVERAGE PLATE CHARACTERISTICS TRIODE CONNECTION



DEC. 26, 1941

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-6348



1S5

1S5

DIODE-PENTODE

MINIATURE TYPE

GENERAL DATA

Electrical:

Filament, Coated:

Voltage. 1.4 dc volts
Current. 0.05 amp

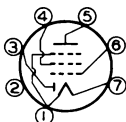
Mechanical:

Mounting Position. Any
Maximum Overall Length 2-1/8"
Maximum Seated Length. 1-7/8"
Length, Base Seat to Bulb Top (excluding tip). 1-1/2" $\pm$ 3/32"
Maximum Diameter 3/4"
Bulb T-5-1/2
Base Small-Button Miniature 7-Pin
Basing Designation for BOTTOM VIEW 6AU

Pin 1 - Filament (-),
Grid No. 3

Pin 2 - No
Connection

Pin 3 - Diode
Plate



Pin 4 - Pentode
Grid No. 2

Pin 5 - Pentode
Plate

Pin 6 - Pentode
Grid No. 1

Pin 7 - Filament (+)

Maximum Ratings, Characteristics, and Typical Operating Conditions for Type 1S5 are the same as those shown for the 1U5.

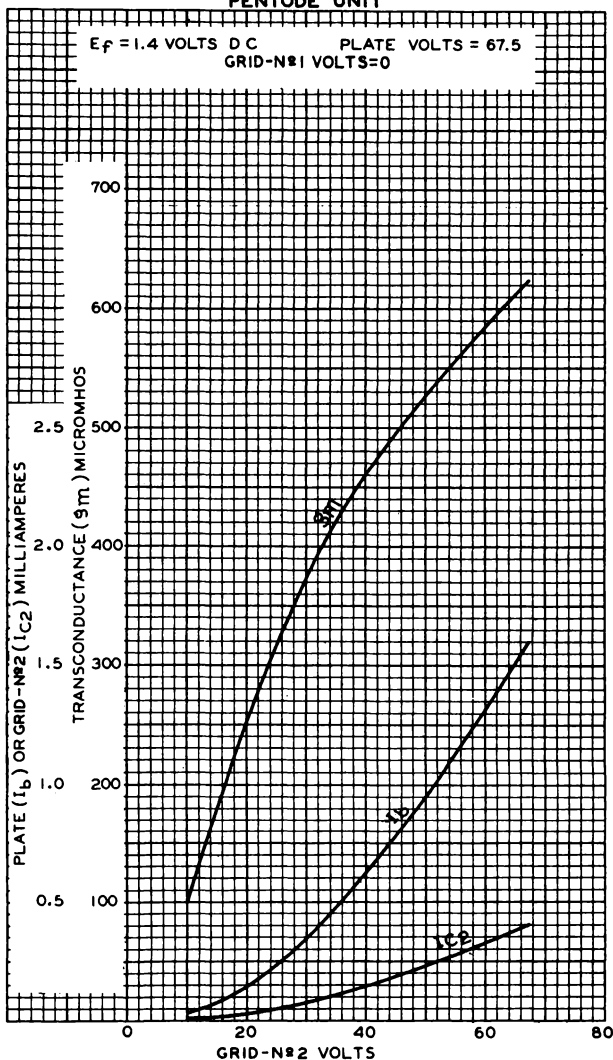
Curves shown under Type 1U5 also apply to the 1S5.

155



155

AVERAGE CHARACTERISTICS PENTODE UNIT



JUNE 12, 1941

TUBE DEPARTMENT

92CM-6297

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



1T4

REMOTE-CUTOFF PENTODE

MINIATURE TYPE

GENERAL DATA

Electrical:

Filament, Coated:

Voltage. 1.4 dc volts

Current. 0.05 amp

Direct Interelectrode Capacitances:⁰

Grid No.1 to plate 0.01 μ f ←

Grid No.1 to filament (-) & grid No.3
& internal shield, and grid No.2 3.6 μ f

Plate to filament (-) & grid No.3
& internal shield, and grid No.2 7.5 μ f

Mechanical:

Mounting Position Any

Maximum Overall Length 2-1/8"

Maximum Seated Length 1-7/8"

Length, Base Seat to Bulb Top (Excluding tip). 2" $\pm$ 3/32" ←

Maximum Diameter 3/4"

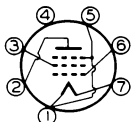
Bulb T-5-1/2

Base Small-Button Miniature 7-Pin (JETEC No.E7-1) ←

Basing Designation for BOTTOM VIEW 6AR

Pin 1-Filament (-),
Grid No.3,
Int. Shield

Pin 2-Plate
Pin 3-Grid No.2
Pin 4-No Connection-
Do Not Use



Pin 5-Filament (-),
Grid No.3,
Int. Shield

Pin 6-Grid No.1

Pin 7-Filament (+)

AMPLIFIER - Class A₁

Maximum Ratings, Design-Center Values:

PLATE VOLTAGE 90 max. volts

GRID-No.2 (SCREEN) SUPPLY VOLTAGE. 90 max. volts

GRID-No.2 VOLTAGE. 67.5 max. volts

GRID-No.1 (CONTROL-GRID) VOLTAGE:

Positive bias value. 0 max. volts

TOTAL CATHODE CURRENT. 5.5 max. ma

Typical Operation and Characteristics:

Plate Voltage. 45 67.5 90 90 volts

Grid-No.2 Voltage. 45 67.5 45 67.5 volts

Grid-No.1 Voltage. 0 0 0 0 volts

Plate Resistance

(Approx.). 0.35 0.25 0.8 0.5 megohm

Transconductance 700 875 750 900 μ hos

Plate Current. 1.7 3.4 1.8 3.5 ma

Grid-No.2 Current. 0.7 1.5 0.65 1.4 ma

Grid-No.1 Voltage for

transconductance of 10 μ hos -10 -16 -10 -16 volts

⁰With or without external shield JETEC No.316 connected to pin No.1.

←Indicates a change.

JAN. 3, 1955

TUBE DIVISION

DATA

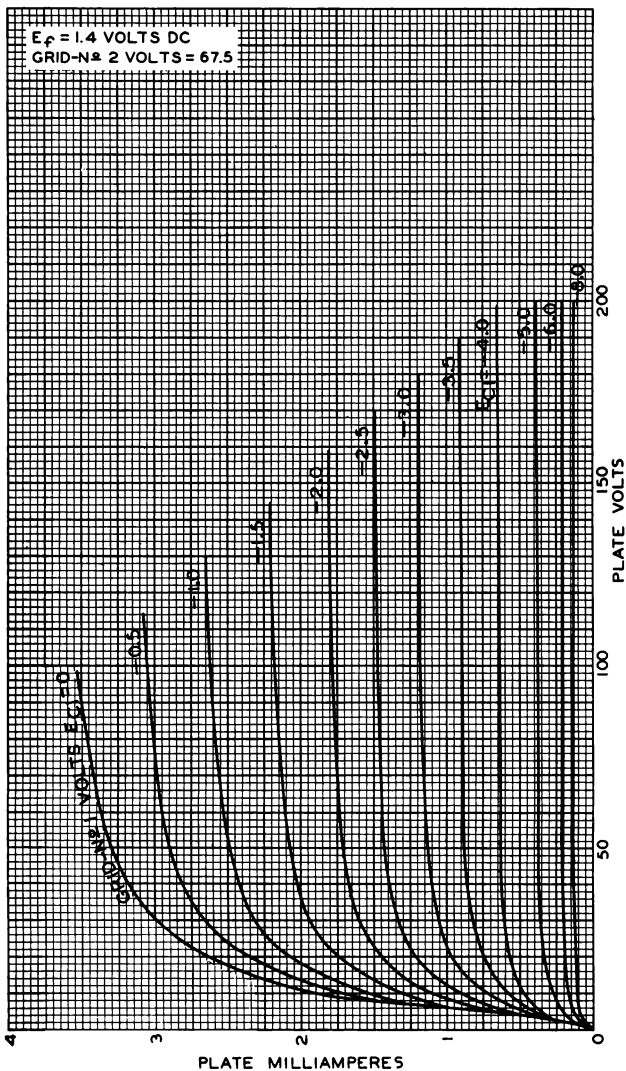
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1T4



1T4

AVERAGE PLATE CHARACTERISTICS



DEC. 27, 1954

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

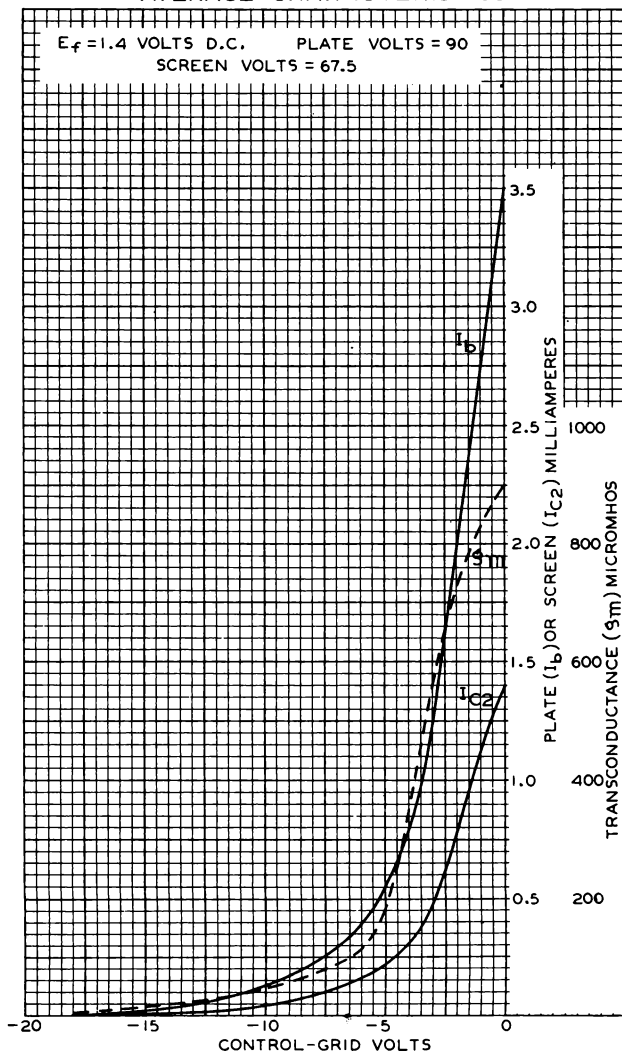
92CM - 6101R2



IT4

IT4

AVERAGE CHARACTERISTICS



JAN. 24, 1942

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

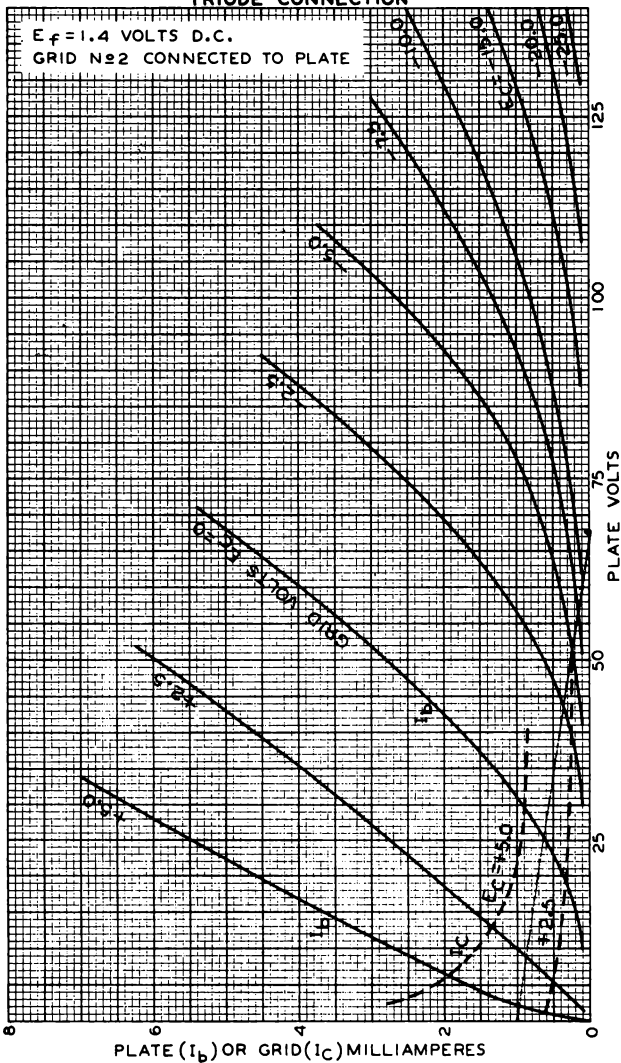
92C-6357

1T4



1T4

AVERAGE PLATE CHARACTERISTICS TRIODE CONNECTION



FEB. 16, 1943

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92C-6352R1



1T6

1T6

DIODE—SHARP-CUTOFF PENTODE

SUBMINIATURE TYPE

GENERAL DATA

Electrical:

Filament, Coated:

Voltage 1.25 dc volts

Current 0.04 amp

Mechanical:

Mounting Position Any

Maximum Overall Length 1-3/4"

Maximum Seated Length 1-1/2"

Length, Base Seat to Bulb Top (excluding tip) 1.200 ± 0.060"

Maximum Diameter 0.4"

Bulb T-3

Base Small-Button Sub-miniatur 8-Pin

BOTTOM VIEW

Pin 1—Pentode Plate

Pin 2—No
Connection

Pin 3—Grid No.1

Pin 4—Filament (-),
Grid No.3



Pin 5—Filament (+)

Pin 6—Diode Plate

Pin 7—No
Connection

Pin 8—Grid No.2

PENTODE UNIT AMPLIFIER — Class A₁

Maximum Ratings, Design-Center Values:

PLATE VOLTAGE 67.5 max. volts

GRID-No.2 (SCREEN) VOLTAGE 67.5 max. volts

TOTAL CATHODE CURRENT 2.0 max. ma

Typical Operation and Characteristics:

Plate Voltage 30 45 67.5 volts

Grid-No.2 Voltage 30 45 67.5 volts

Grid-No.1 (Control-Grid) Voltage 0 0 0 volts

Plate Resistance (Approx.) 0.5 0.5 0.4 megohm

Transconductance 330 475 600 μ mos

Plate Current 0.33 0.75 1.6 ma

Grid-No.2 Current 0.10 0.21 0.4 ma

DIODE UNIT

Maximum Ratings, Design-Center Values:

PLATE CURRENT 0.25 max. ma

Diode Considerations:

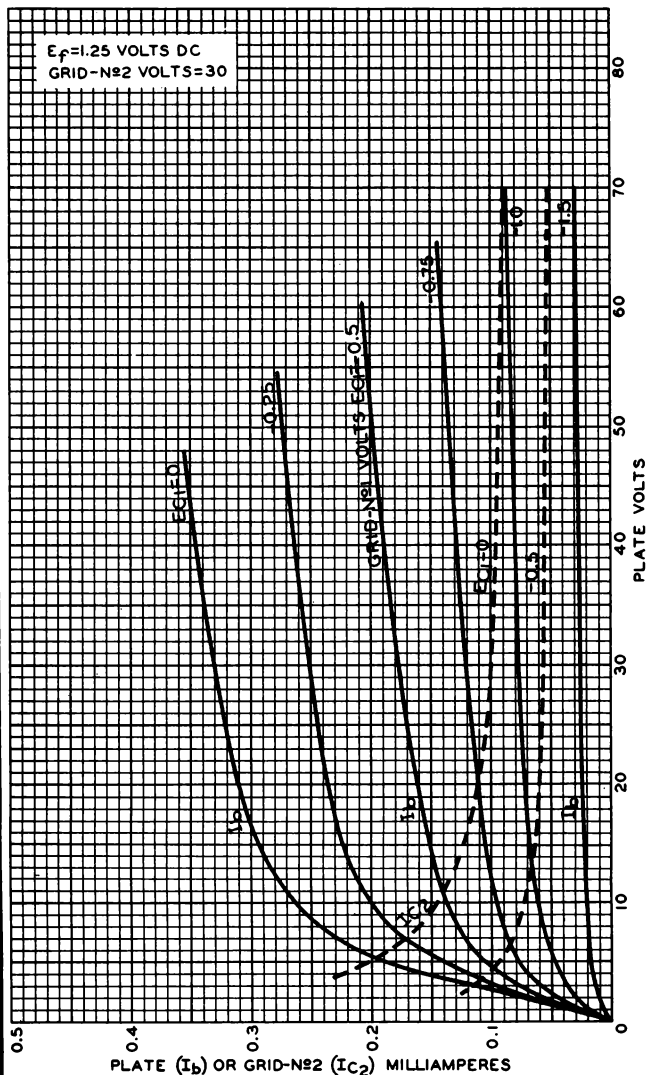
The diode is located at the negative end of the filament and is independent of the pentode unit except for the common filament.

1T6



1T6

AVERAGE PLATE CHARACTERISTICS



APRIL 26, 1949

TUBE DEPARTMENT

92CM-7280

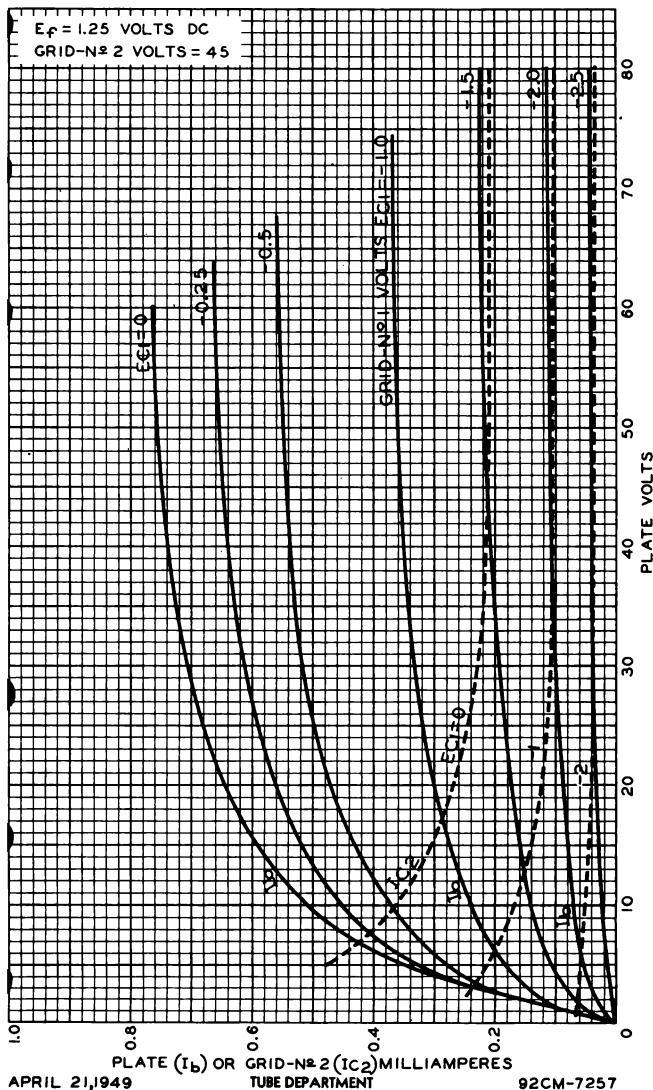
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



1T6

1T6

AVERAGE PLATE CHARACTERISTICS

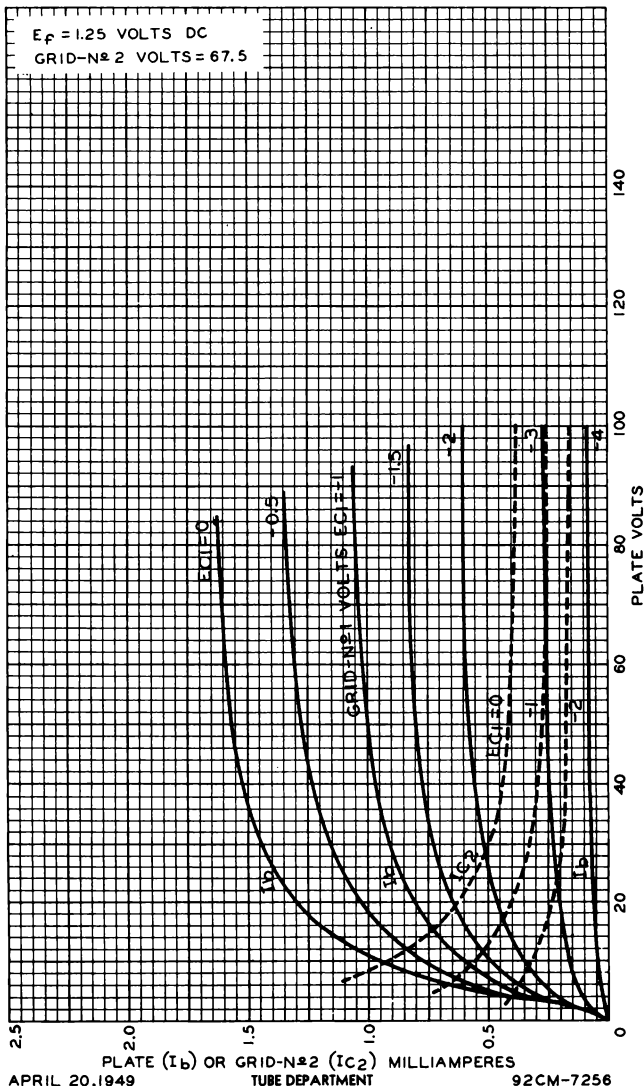


1T6



1T6

AVERAGE PLATE CHARACTERISTICS

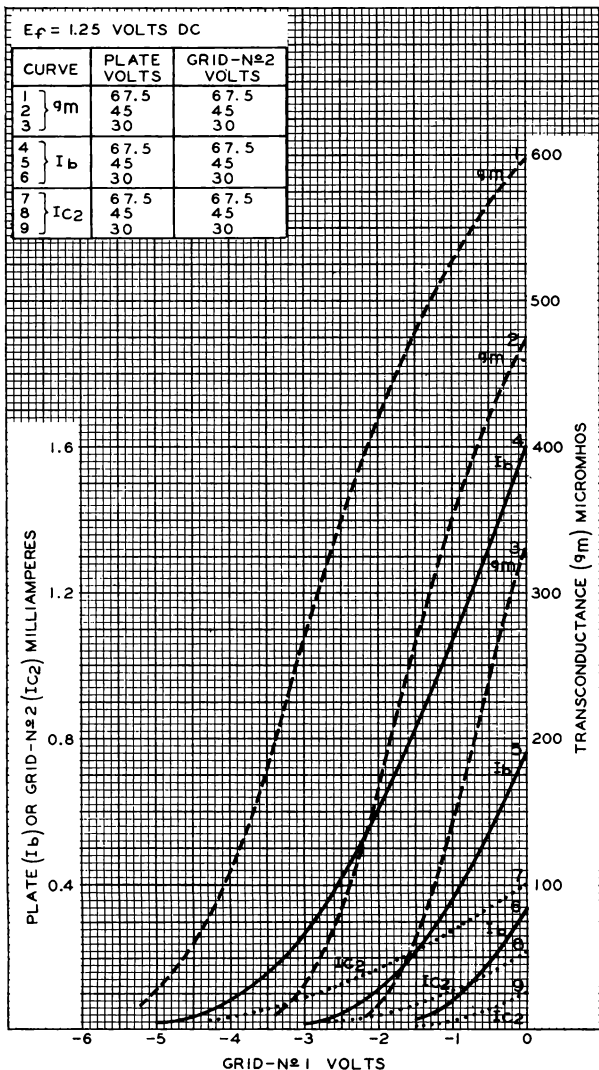




1T6

1T6

AVERAGE CHARACTERISTICS



APRIL 25, 1949

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7259



1U4

SHARP-CUTOFF PENTODE

MINIATURE TYPE

GENERAL DATA

Electrical:

Filament, Coated:

Voltage 1.4 dc volts

Current 0.05 amp

Direct Interelectrode Capacitances:

Grid No.1 to plate^o 0.01 max. $\mu\mu\text{f}$ ←Grid No.1 to filament (-) &
grid No.3 & internal shield,
and grid No.2[•] 3.6 $\mu\mu\text{f}$ Plate to filament (-) &
grid No.3 & internal shield,
and grid No.2[•] 7.5 $\mu\mu\text{f}$ Characteristics, Class A₁ Amplifier:

Plate Voltage 90 volts

Grid-No.2 Voltage 90 volts

Grid-No.1 Voltage 0 volts

Plate Resistance (Approx.) 1 megohm ←

Transconductance 900 μmhos

Plate Current 1 ma ←

Grid-No.2 Current 0.5 ma ←

Grid-No.1 Voltage (Approx.) for
transconductance of 10 μmhos -4 volts ←

Mechanical:

Mounting Position Any

Maximum Overall Length 2-1/8"

Maximum Seated Length 1-7/8"

Length, Base Seat to Bulb Top (Excluding tip) . 1-1/2" $\pm 3/32$ "

Maximum Diameter 3/4"

Bulb T-5-1/2

Base Small-Button Miniature 7-Pin (JETEC No.E7-1)

Basing Designation for BOTTOM VIEW 6AR

Pin 1-Filament (-), Pin 5-Filament (-),

Grid No.3, Grid No.3,

Internal Internal

Shield Shield

Pin 2-Plate

Pin 3-Grid No.2

Pin 4-No Connection

Pin 6-Grid No.1

Pin 7-Filament (+)

AMPLIFIER - Class A₁

Maximum Ratings, Design-Center Values:

PLATE VOLTAGE 110 max. volts

GRID-No.2 (SCREEN) VOLTAGE 110 max. volts

^o Without external shield.[•] With external shield JETEC No.316 connected to pin No.1 or pin No.5.

←Indicates a change.

IU4



IU4

SHARP-CUTOFF PENTODE

GRID-No.1 (CONTROL-GRID) VOLTAGE:

→ Positive bias value 0 max. volts
 TOTAL CATHODE CURRENT 6 max. ma

Typical Operation as Resistance-Coupled Amplifier:

*See RESISTANCE-COUPLED AMPLIFIER CHART No.3
 at front of this Section*

→Indicates a change.

NOV. 5, 1954

TUBE DIVISION

DATA

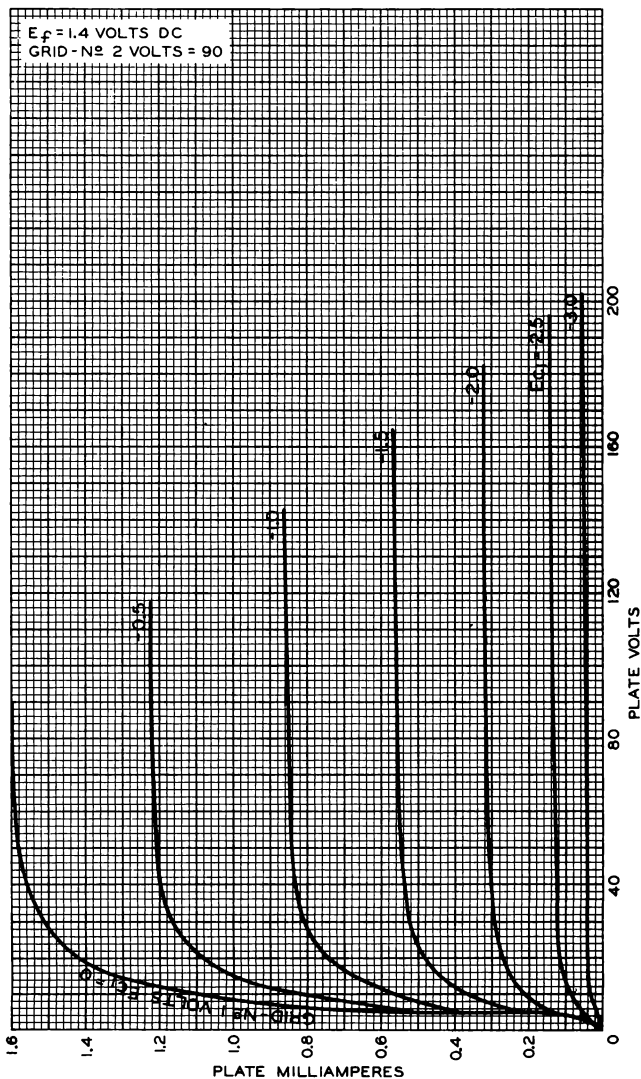
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



1U4

1U4

AVERAGE PLATE CHARACTERISTICS



FEB. 6, 1946

TUBE DIVISION

92CM-6669RI

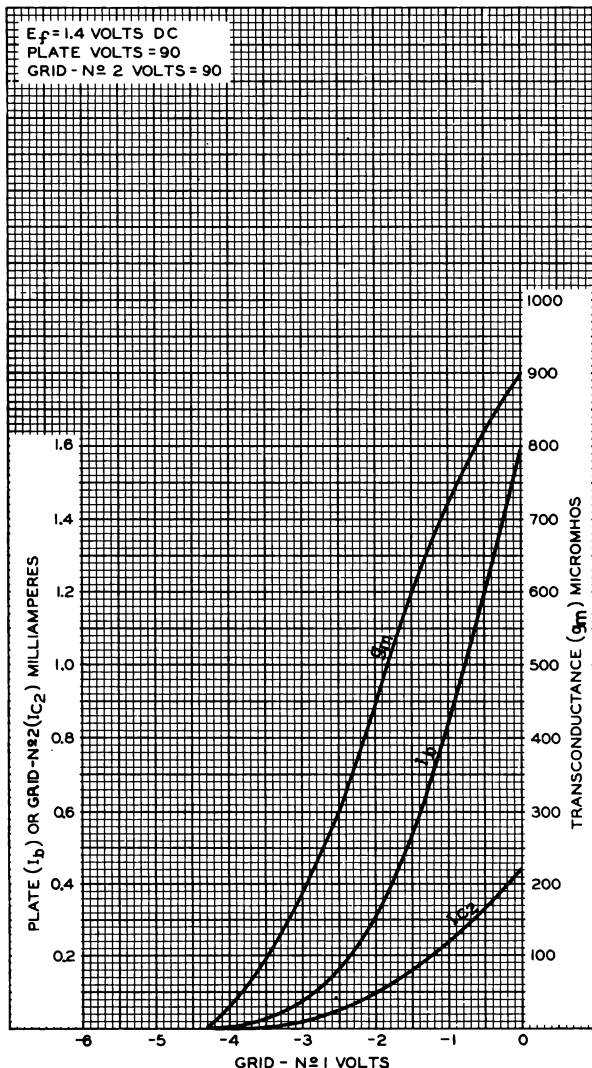
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

1U4



1U4

AVERAGE CHARACTERISTICS



FEB. 6, 1946

TUBE DIVISION
 RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6668R1



IU5

DIODE-PENTODE

MINIATURE TYPE

GENERAL DATA

Electrical;

Filament, Coated:

Voltage.	1.4	dc volts
Current.	0.05	amp

Mechanical:

Mounting Position.	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (excluding tip).	1-1/2" $\pm$ 3/32"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base	Small-Button Miniature 7-Pin
Basing Designation for BOTTOM VIEW	6BW

Pin 1-Filament (-),
Pentode
Grid No.3

Pin 2-Pentode
Plate

Pin 3-Pentode
Grid No.2



Pin 4-Diode Plate

Pin 5-No
Connection

Pin 6-Pentode
Grid No.1

Pin 7-Filament (+)

PENTODE UNIT AMPLIFIER-Class A₁

Maximum Ratings, Design-Center Values:

PLATE VOLTAGE.	90 max. volts
GRID-No.2 (SCREEN) VOLTAGE	90 max. volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:	
Negative bias value	50 max. volts
Positive bias value	0 max. volts
TOTAL MAX.-SIGNAL CATHODE CURRENT.	3 max. ma.

Characteristics:

Plate Voltage.	67.5	volts
Grid-No.2 Voltage	67.5	volts
Grid-No.1 Voltage	0	volts
Plate Resistance (Approx.)	0.6	megohm
Transconductance	625	μ mhos
Plate Current.	1.6	ma.
Grid-No.2 Current.	0.4	ma.

Typical Operation as Resistance-Coupled Amplifier:

See RESISTANCE-COUPLED AMPLIFIER CHART at front of this Section.

DIODE UNIT

The diode is located at the negative end of the filament and is independent of the pentode unit except for the common filament.

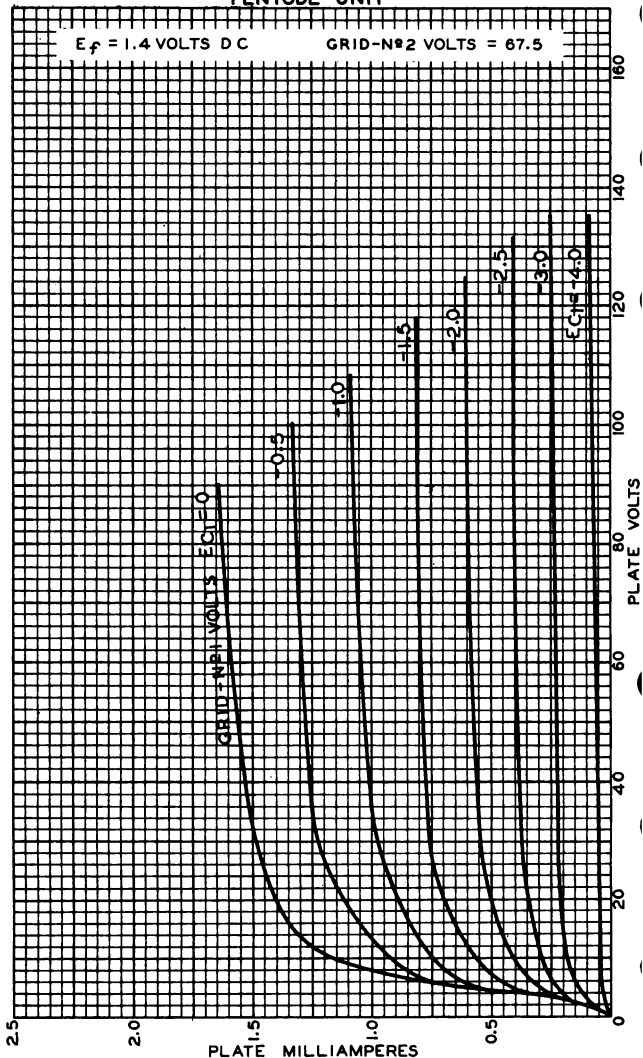
Curve shown under Type 1S5 also applies to the IU5.

1U5



1U5

AVERAGE PLATE CHARACTERISTICS PENTODE UNIT



JUNE 12, 1941

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

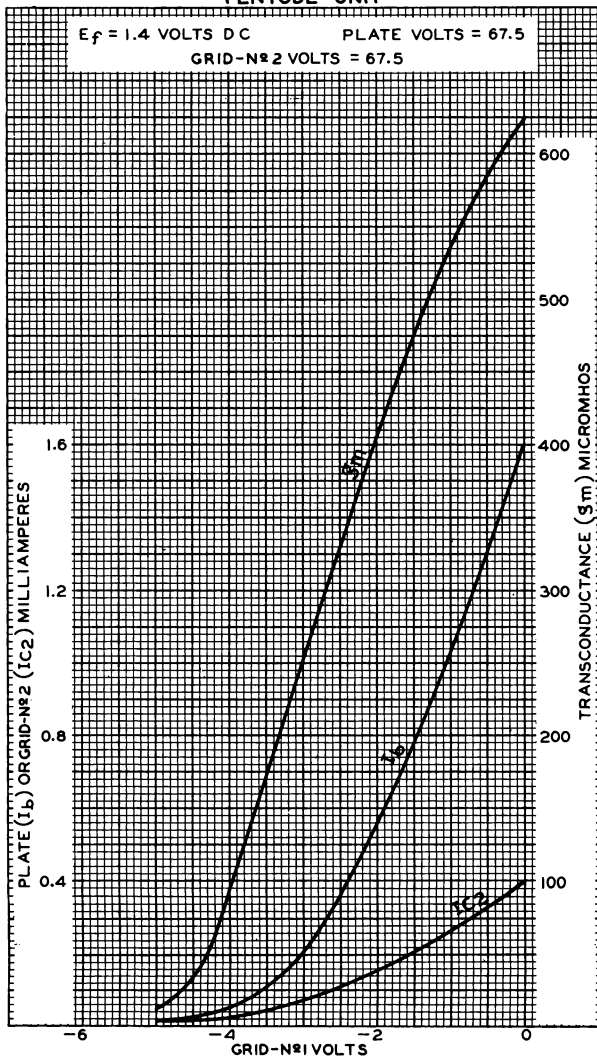
92CM-6158RI



IU 5

IU5

AVERAGE CHARACTERISTICS PENTODE UNIT



JUNE 12, 1941

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

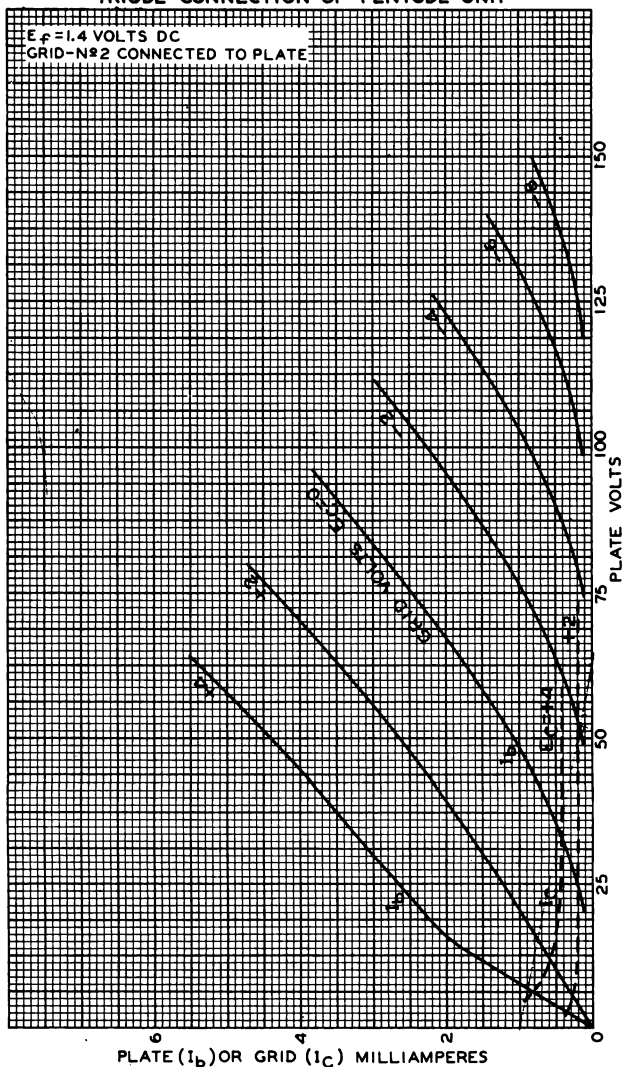
92CM-6172R1

1U5



1U5

AVERAGE PLATE CHARACTERISTICS TRIODE CONNECTION OF PENTODE UNIT



JAN. 2, 1942

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM - 6351R1



I-V

**HALF-WAVE HIGH-VACUUM RECTIFIER**

The I-V supersedes the mercury-vapor type 1 and is interchangeable with it.

Heater	Coated Unipotential Cathode	
Voltage	6.3	a-c or d-c volts
Current	0.3	amp.
Maximum Overall Length		4-3/16"
Maximum Diameter		1-9/16"
Bulb		ST-12
Base		Small 4-Pin
Pin 1-Heater		Pin 3-Cathode
Pin 2-Plate		Pin 4-Heater
Mounting Position	Any	

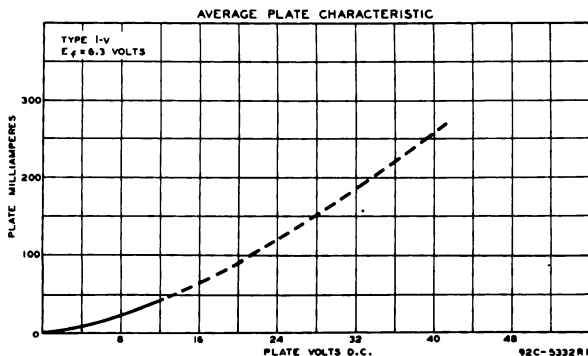


BOTTOM VIEW (4G)

HALF-WAVE RECTIFIER

Peak Inverse Voltage	1000 max. volts
Peak Plate Current	270 max. ma.
D-C Heater-Cathode Potential	500 max. volts
Typical Operation with Condenser-Input Filter:	
A-C Plate Voltage (RMS)	117 150 325 max. volts
Total Effective Plate-Supply Impedance Δ	0 min. 30 min. 75 min. ohms
D-C Output Current	45 max. 45 max. 45 max. ma.

- under no condition of operation should the normal operating heater voltage of 6.3 volts ever fluctuate to exceed a maximum of 7.5 volts.
 Δ When a filter-input condenser larger than 40 μ f is used, it may be necessary to use more plate-supply impedance than the minimum value shown to limit the peak plate current to the rated value.



FEB. 2, 1940

RCA RADOTRON DIVISION
 RCA MANUFACTURING COMPANY, INC.

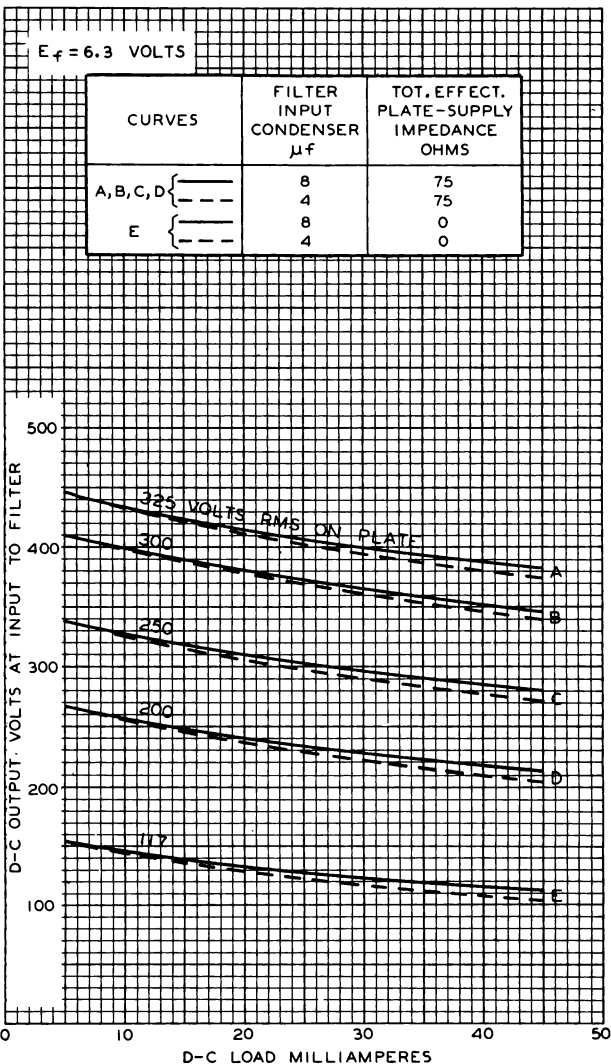
DATA

I-V



I-V

OPERATION CHARACTERISTICS





IV2

HALF-WAVE VACUUM RECTIFIER

MINIATURE TYPE

GENERAL DATA

Electrical:

Filament, Coated:

*Voltage.	0.625	ac volt
Current.	0.3	amp
Direct Interelectrode Capacitance (Approx.): ^o		
Plate to Filament.	0.8	$\mu\mu\text{f}$

^o With no external shield.

Mechanical:

Mounting Position.	Any
Maximum Overall Length.	2-3/16"
Maximum Seated Length.	1-15/16"
Length, Base Seat to Bulb Top (Excluding tip).	1-9/16" $\pm$ 3/32"
Maximum Diameter.	7/8"
Bulb.	T-6-1/2
Base.	Small-Button Noval 9-Pin
Basing Designation for BOTTOM VIEW.	9U

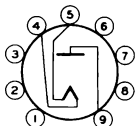
Pin 1- Internal

Connection-
Do Not Use

Pin 2-Same as pin 1

Pin 3-Same as pin 1

Pin 4-Filament



Pin 5-Filament

Pin 6-Same as pin 1

Pin 7-Same as pin 1

Pin 8-Same as pin 1

Pin 9-Plate

HALF-WAVE RECTIFIER

*Pulsed-Rectifier Service**

Maximum Ratings, Design-Center Values:

PEAK INVERSE PLATE VOLTAGE.	7500 max.	volts
PEAK PLATE CURRENT.	10 max.	ma
AVERAGE PLATE CURRENT.	0.5 max.	ma

* The duration of the voltage pulse must not exceed 15% of one horizontal scanning cycle in a 525-line, 30-frame system as described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations", Federal Communications Commission. In such a system, 15% of one scanning cycle is 10 microseconds.

OPERATING NOTES

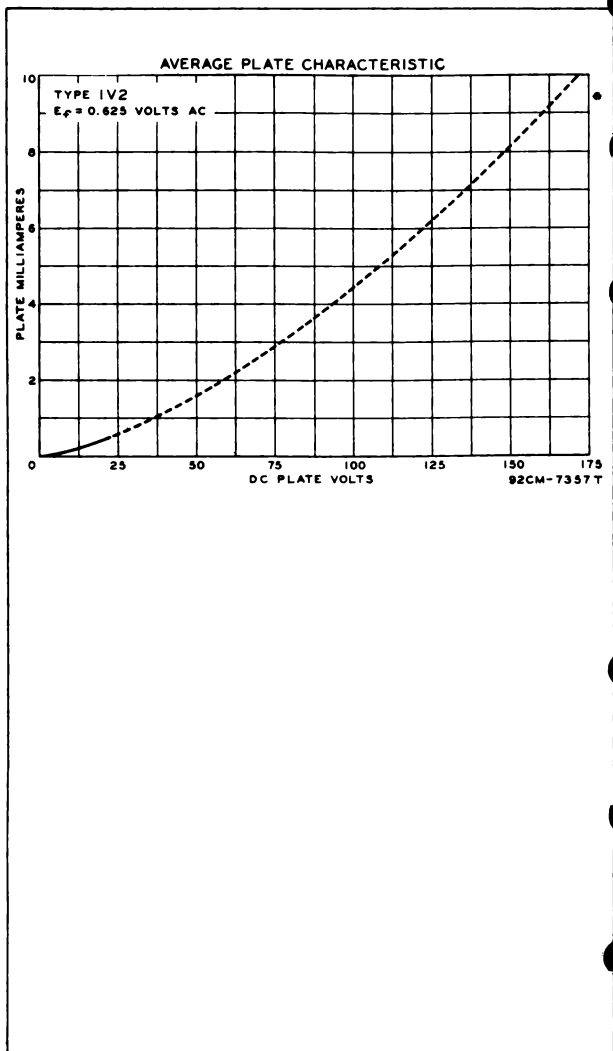
When the filament voltage is measured, it is recommended that a thermal rms voltmeter be used. The meter and its leads must be insulated to withstand 15000 volts and the stray capacitances to ground should be minimized.

IV2



IV2

HALF-WAVE VACUUM RECTIFIER





IX2-A

IX2-A HALF-WAVE VACUUM RECTIFIER

9-PIN MINIATURE TYPE
Supersedes Type 1X2

GENERAL DATA

Electrical:

Filament, Coated:

Voltage. 1.25 ac volts

Current. 0.2 amp

Direct Interelectrode Capacitance (Approx.):^o

Plate to Filament. 1 μf

^o With no external shield.

Mechanical:

Mounting Position. Any

Overall Length 2-11/16 $\pm$ 1/8"

Maximum Diameter 7/8"

Bulb T-6-1/2

Cap. Skirted Miniature, JETEC C1-33

Base Small-Button Noval 9-Pin

Basing Designation for BOTTOM VIEW 9Y

Pin 1-Filament,

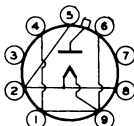
Internal

Shield

Pin 2-Filament

Pin 3-See NOTE

Pin 4-Same as Pin 1



Pin 5-Same as Pin 2

Pin 6-Same as Pin 1

Pin 7-Same as Pin 3

Pin 8-Same as Pin 2

Pin 9-Same as Pin 1

Cap - Plate

NOTE: May be connected to filament;
otherwise, do not use.

PULSED-RECTIFIER SERVICE

Maximum Ratings, Design-Center Values:

For operation in a 525-line, 30-frame system[□]

PEAK INVERSE PLATE VOLTAGE 18000 max. volts

DC OUTPUT VOLTAGE. 16000 max. volts

PEAK PLATE CURRENT 10 max. ma

AVERAGE PLATE CURRENT. 1 max. ma

Typical Operation:

Peak Positive-Pulse Plate Supply Voltage*. 14000 volts

Peak Negative-Pulse Plate Supply Voltage*. 3500 volts

Peak Inverse Plate Voltage 17500 volts

DC Output Voltage. 14000 volts

DC Output Current. 175 μa

[□] As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations", Federal Communications Commission.

* The duration of the voltage pulse must not exceed 15% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one horizontal scanning cycle is 10 microseconds.

IX2-A



IX2-A

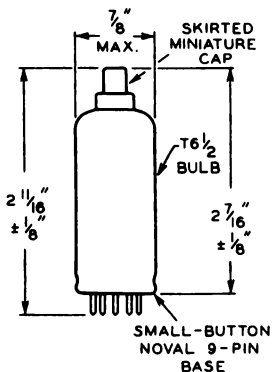
HALF-WAVE VACUUM RECTIFIER

OPERATING NOTES

When the filament is supplied from an rf power source which is at a high dc potential above ground, adjustment of the filament voltage by direct measurement is usually impractical. However, a simple method utilizing visual comparison of filament temperatures can be used for adjustment of filament power. The color temperature of the filament operating from an rf power source may be checked visually by observing in a darkened room the reflection of the incandescent filament upon the surface of the internal shield. A visual comparison of this color temperature with that obtained when the filament of another IX2-A is operated from a dc or low-frequency ac supply of 1.25 volts, provides a convenient means for adjusting the amount of rf excitation to produce 1.25 volts (rms) at the filament terminals.

The voltages employed in some television receivers and other high-voltage equipment are sufficiently high that high-voltage rectifier tubes may produce x-rays which can constitute a health hazard, unless such tubes are adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.

The AVERAGE PLATE CHARACTERISTIC curve shown for type 1B3-GT also applies to the IX2-A within ratings



NOV. 1, 1950

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

TENTATIVE DATA



IX2-B

HALF-WAVE VACUUM RECTIFIER

9-PIN MINIATURE TYPE

IX2-B

GENERAL DATA

Electrical:

Filament, Coated:

Voltage 1.25 ac volts

Current 0.2 amp

Direct Interelectrode Capacitance (Approx.):^oPlate to Filament 1 μf

Mechanical:

Mounting Position Any

Maximum Overall Length 2-27/32"

Seated Length 2-7/16" $\pm$ 1/8"

Maximum Diameter 7/8"

Bulb T-6-1/2

Cap Skirted Miniature (JETEC No. C1-2 or C1-33)

Base Small-Button Noval 9-Pin (JETEC No. E9-1)

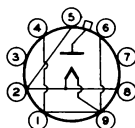
BOTTOM VIEW

Pin 1-Filament,
Int. Shield

Pin 2-Filament

Pin 3-No. Conn.-
Do Not UsePin 4-Filament,
Int. Shield

Pin 5-Filament

Pin 6-Filament,
Int. ShieldPin 7-No. Conn.-
Do Not Use

Pin 8-Filament

Pin 9-Filament,
Int. Shield

Cap-Plate

PULSED-RECTIFIER SERVICE

Maximum Ratings, Design-Center Values Except as Noted:

For operation in a 525-line, 30-frame system*

PEAK INVERSE PLATE VOLTAGE

(Absolute Maximum)[■] 22000[●] max. volts

PEAK PLATE CURRENT 45 max. ma

AVERAGE PLATE CURRENT 0.5 max. ma

Typical Operation:

Peak Plate Supply Voltage:

Positive Pulse Value 18000 volts

Negative Pulse Value 2000 volts

DC Output Voltage (Approx.) 18000 volts

DC Output Current (Approx.) 100 μamp ^o With no external shield.

* As described in "Standards of Good Engineering Practice Concerning Television Stations", Federal Communications Commission.

[●] Under no circumstances should this absolute value be exceeded.[■] The dc component must not exceed 18000 volts.

MARCH 1, 1954

TUBE DEPARTMENT

TENTATIVE DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

IX2-B



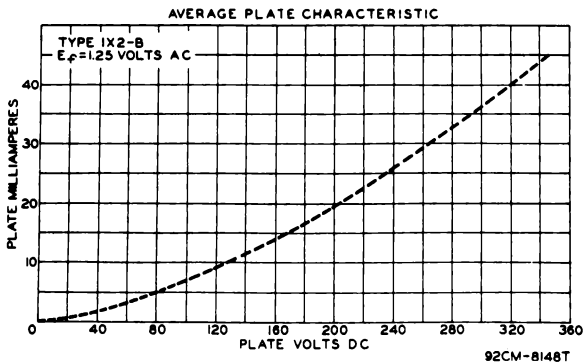
IX2-B

HALF-WAVE VACUUM RECTIFIER

OPERATING NOTES

When the *filament* is operated on rf, the color temperature of the filament operating from a pulse-operated or rf power source may be checked usually by observing in a darkened room the reflection of the incandescent filament upon the surface of the internal shield. A visual comparison of this color temperature with that obtained when the filament of another IX2-B is operated from a dc or low-frequency ac supply of 1.25 volts, provides a convenient means for adjusting the amount of rf excitation to produce 1.25 volts (rms) at the filament terminals.

The voltages employed in some television receivers and other high-voltage equipment is sufficiently high that high-voltage rectifier tubes may produce x-rays which constitute a hazard unless such tubes are adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.



2A3



2A3 POWER TRIODE

PUSH-PULL AMPLIFIER - Class AB₁

Maximum Ratings, Design-Center Values:

PLATE VOLTAGE.	300 max. volts
PLATE DISSIPATION.	15 max. watts

Typical Operation:

Values are for 2 tubes

	Fixed Bias	Cathode Bias	
Plate Voltage.	300	300 •	volts
Grid Voltage#	-62	-	volts
Cathode-Bias Resistor.	-	780	ohms
→ Peak AF Grid-to-Grid Voltage . . .	124	156	volts
Zero-Signal Plate Current.	80	80	ma.
→ Max.-Signal Plate Current.	147	100	ma.
Effective Load Resistance (plate to plate)	3000	5000	ohms
Total Harmonic Distortion.	2.5	5.0	%
Power Output	15	10	watts

Maximum Circuit Values: □

Grid-Circuit Resistance. . .	{ fixed bias 0.05 max. megohm
	{ cathode bias 0.5 max. megohm

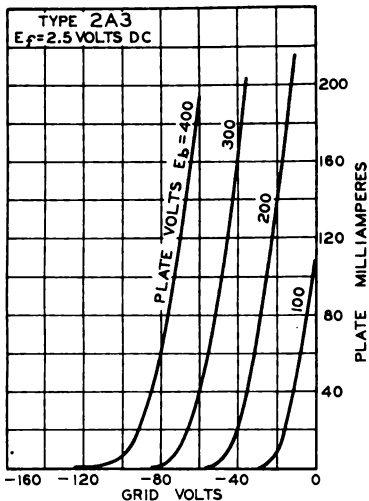
Grid voltage referred to mid-point of ac-operated filament.

▲ When a single 2A3 is operated cathode-biased, the cathode-biasing resistor value should be 750 ohms.

□ The type of coupling used should not introduce too much resistance in the grid circuit. Transformer or impedance-coupling devices are recommended.

• For zero-signal conditions.

AVERAGE CHARACTERISTICS



→ Indicates a change.

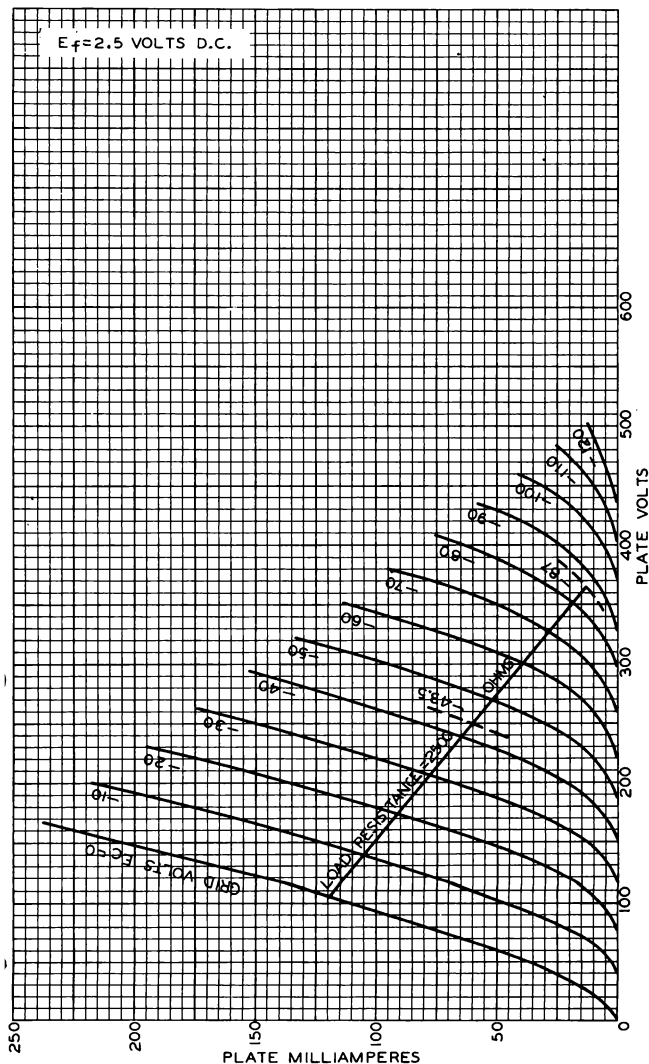
92CM-5328T

OCTOBER 15, 1947

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA

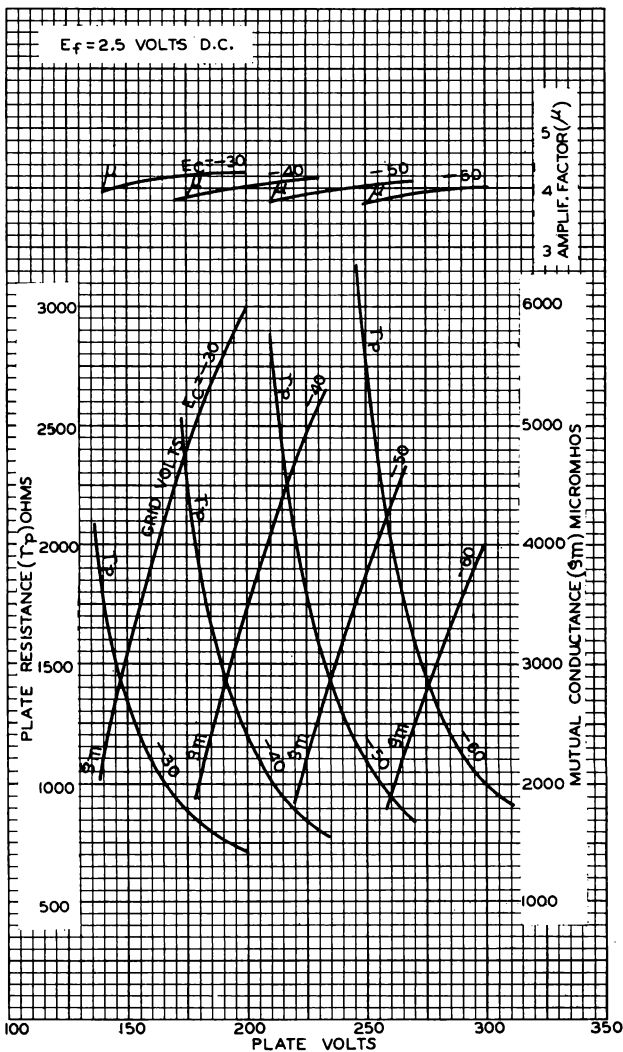
AVERAGE PLATE CHARACTERISTICS



2A3



AVERAGE CHARACTERISTICS



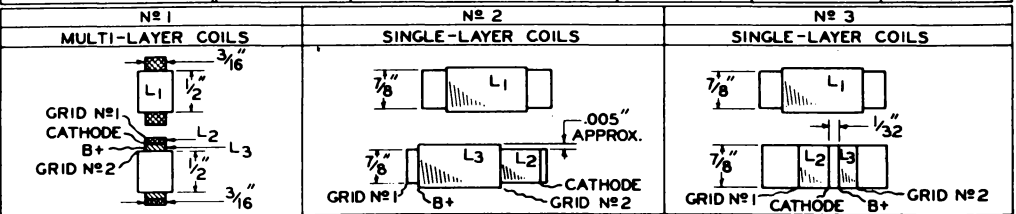


TYPES 2A7 AND 6A7

TYPICAL PENTAGRID CONVERTER CIRCUIT
COIL DESIGN DETAILS

(continued from preceding page)

FREQUENCY BAND MEGACYCLES	0.15 TO 0.40		0.55 TO 1.5				1.5 TO 4.0		4.0 TO 10		10 TO 25	
ASSEMBLY N°	1		1		2		2		3		3	
	TURNS	WIRE #	TURNS	WIRE #	TURNS	WIRE #	TURNS	WIRE #	TURNS	WIRE #	TURNS	WIRE #
R-F COIL (L ₁)	422	36 SSE	116	30 SSE	146	32 ENAM	36.2	30 ENAM	10.1	30 ENAM	4.4	20 ENAM
OSC. GRID COIL (L ₂)	198	36 SSE	80	30 SSE	92	32 ENAM	30.9	30 ENAM	9.7	30 ENAM	4.3	20 ENAM
OSC. PLATE COIL (L ₃)	60	36 SSE	30	30 SSE	20	32 ENAM	12	30 ENAM	12	36 ENAM	6	36 ENAM
OSC. TRACKING COND. (C ₄)	117 $\mu\mu f$		400 $\mu\mu f$				1070 $\mu\mu f$		2900 $\mu\mu f$		7300 $\mu\mu f$	





2AF4-A

MEDIUM-MU TRIODE

MINIATURE TYPE

*Intended for use in UHF TV equipment having
series heater-string arrangement*

2AF4-A

The 2AF4-A is the same as the 6AF4-A except for the following items:

Heater, for Unipotential Cathode:

Voltage. 2.35 ac or dc volts

Current. 0.6 amp

Warm-up time (Average) . 11 sec

*For definition of heater warm-up time and method of determining
it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of
this Section.*



2B7

2B7

TWIN DIODE—REMOTE-CUTOFF PENTODE

Heater, for Unipotential Cathode:

Voltage. 2.5 ac or dc volts

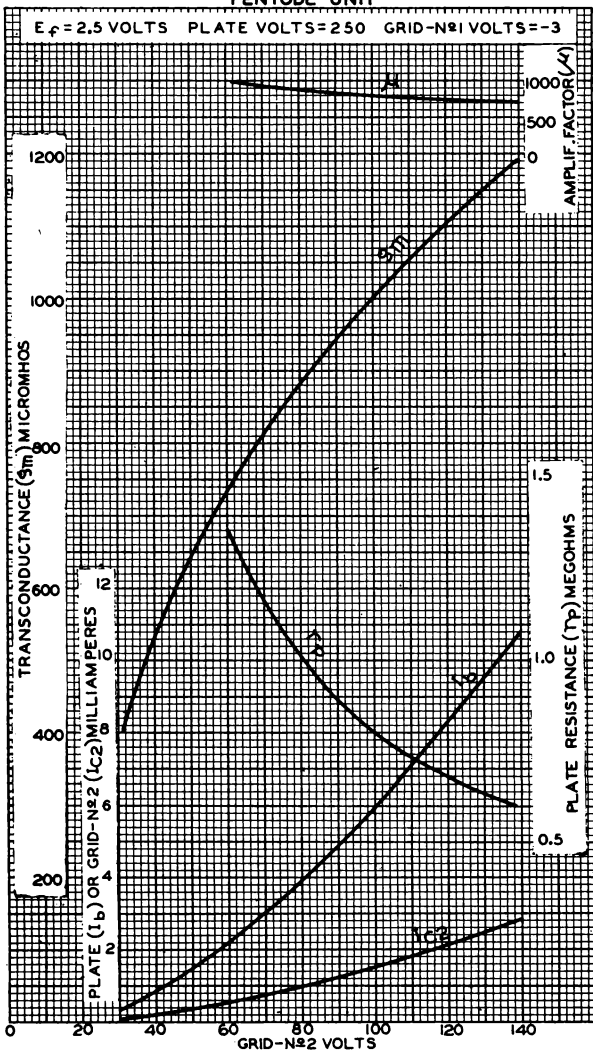
Current. 0.8 amp

The 2B7 is the same as the 6B7 except for heater rating.

2B7



2B7 AVERAGE CHARACTERISTICS PENTODE UNIT



FEB. 6, 1933

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-5254



3A2

3A2

HALF-WAVE VACUUM RECTIFIER

9-PIN MINIATURE TYPE

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathode:

Voltage 3.15 ac volts

Current 0.22 amp

Direct Interelectrode Capacitance (Approx.):*

Plate to heater, cathode, and
internal shield 1.0 μf **Mechanical:**

Mounting Position Any

Maximum Overall Length 2-13/16"

Seated Length 2-7/16" $\pm 1/8$ "

Maximum Diameter 7/8"

Bulb T-6-1/2

Cap Skirted Miniature (JETEC No.C1-33)

Base Small-Button Noval 9-Pin (JETEC No.E9-1)

Basing Designation for BOTTOM VIEW 9DT

Pin 1-Heater,
Cathode,
Int. Shield

Pin 2-Heater

Pin 3-No
Connection-
Do Not UsePin 4-Heater,
Cathode,
Int. Shield

Pin 5-Heater

Pin 6-Heater,
Cathode,
Int. ShieldPin 7-No
Connection-
Do Not Use

Pin 8-Heater

Pin 9-Heater,
Cathode,
Int. Shield**PULSED-RECTIFIER SERVICE****Maximum Ratings, Design-Center Values:***For operation in a 525-line, 30-frame system***

PEAK INVERSE PLATE VOLTAGE 18000 max. volts

PEAK PLATE CURRENT 80 max. ma

AVERAGE PLATE CURRENT 1.5 max. ma

* With no external shield.

** As described in "Standards of Good Engineering Practice Concerning Television Stations", Federal Communications Commission.

OPERATING NOTES

Measurement of Heater Voltage. To measure the heater voltage when the heater is at a high dc potential with respect to ground, it is recommended that a voltmeter of the thermocouple type calibrated in rms volts be used. The meter and its leads must be insulated to withstand the dc output voltage. In some circuit designs, particularly in voltage-multiplier circuits where the heater

MAY 3, 1954

TUBE DIVISION

TENTATIVE DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

3A2

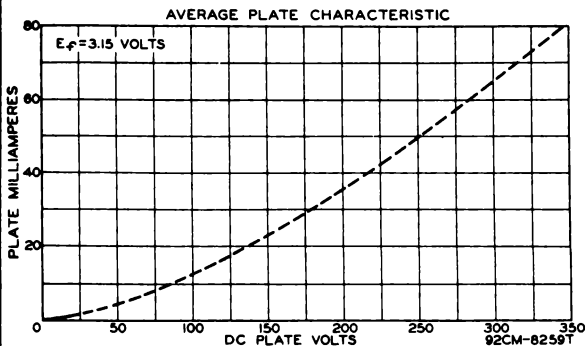


3A2

HALF-WAVE VACUUM RECTIFIER

of a rectifier tube may be at a high ac potential with respect to ground, measurement of the heater voltage of this tube with a thermocouple meter is not practical because the capacitances of the meter and the meter leads will load the circuit and affect circuit operation. Therefore, a simple method utilizing visual comparison of heater temperatures can be used for adjustment of heater power. The color temperature of the heater operating from a pulse-operated power source may be checked visually by observing in a darkened room the reflection of the incandescent heater upon the surface of the internal shield. A visual comparison of this color temperature with that obtained when the heater of another 3A2 is operated from a dc or low-frequency ac supply of 3.15 volts, provides a convenient means for adjusting the heater voltage to the proper rms value.

The voltages employed in some television receivers and other high-voltage equipment are sufficiently high that high-voltage rectifier tubes may produce x-rays which can constitute a health hazard unless such tubes are adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.





3A3

3A3

HALF-WAVE VACUUM RECTIFIER

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage 3.15 ac volts

Current 0.22 amp

Direct Interelectrode Capacitance (Approx.):•

Plate to Heater, Cathode, and
Internal Shield 1.5 μf

Mechanical:

Mounting Position Any

Maximum Overall Length 4-1/16"

Seated Length 3-5/16" $\pm$ 3/16"

Maximum Diameter 1-9/32"

Bulb T-9

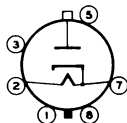
Cap Small (JETEC No.C1-1)

Base Intermediate-Shell Octal 6-Pin (JETEC No.B6-8)

BOTTOM VIEW

Pin 1 - Int. Conn.-
Do Not Use

Pin 2 - Heater

Pin 3 - Int. Conn.-
Do Not UsePin 5 - Int. Conn.-
Do Not UsePin 7 - Heater,
Cathode,
Int. Shield
Pin 8 - Int. Conn.-
Do Not Use
Cap - Plate

PULSED-RECTIFIER SERVICE

Maximum Ratings, Design-Center Values:

For operation in a 525-line, 30-frame system[▲]

PEAK INVERSE PLATE VOLTAGE 30000 max. volts

PEAK PLATE CURRENT 80 max. ma

AVERAGE PLATE CURRENT 1.5 max. ma

• With no external shield.

▲ As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations," Federal Communications Commission.

OPERATING NOTES

Measurement of Heater Voltage. To measure the heater voltage when the heater is at a high dc potential with respect to ground, it is recommended that a voltmeter of the thermocouple type calibrated in rms volts be used. The meter and its leads must be insulated to withstand 20000 volts and the stray capacitances to ground should be minimized.

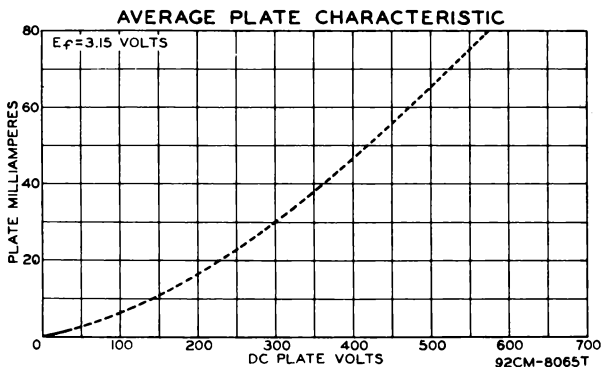
3A3



3A3

HALF-WAVE VACUUM RECTIFIER

The voltages employed in some television receivers and other high-voltage equipment are sufficiently high that high-voltage rectifier tubes may produce x-rays which can constitute a health hazard unless such tubes are adequately shielded. Relatively simple shielding should, prove adequate, but the need for this precaution should be considered in equipment design.



**3AL5****TWIN DIODE**

7-PIN MINIATURE TYPE

*Intended for use in equipment having
series heater-string arrangement***3AL5
TO
3AV6***The 3AL5 is the same as the 6AL5 except for the following items:*

Heater, for Unipotential Cathode:

Voltage 3.15 ac or dc volts

Current 0.6 amp

Warm-up time (Average)* 11 sec

3AU6**SHARP-CUTOFF PENTODE**

7-PIN MINIATURE TYPE

*Intended for use in equipment having
series heater-string arrangement**The 3AU6 is the same as the 6AU6 except for the following items:*

Heater, for Unipotential Cathode:

Voltage 3.15 ac or dc volts

Current 0.6 amp

Warm-up time (Average)* 11 sec

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode 200 max. volts

Heater positive with respect to cathode 200[▲]max. volts**3AV6****TWIN DIODE—HIGH-MU TRIODE**

7-PIN MINIATURE TYPE

*Intended for use in equipment having
series heater-string arrangement**The 3AV6 is the same as the 6AV6 except for the following items:*

Heater, for Unipotential Cathode:

Voltage 3.15 ac or dc volts

Current 0.6 amp

Warm-up time (Average)* 11 sec

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode 200 max. volts

Heater positive with respect to cathode 200[▲]max. volts

* For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

[▲] The dc component must not exceed 100 volts.

JULY 1, 1955

TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA



3B2

3B2

HALF-WAVE VACUUM RECTIFIER

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

Voltage. 3.15 ac volts

Current. 0.22 amp

Direct Interelectrode Capacitance (Approx.):^oPlate to cathode & internal
shield & heater. 1.8 μf

Mechanical:

Mounting Position. Any

Maximum Overall Length 5-7/32"

Seated Length. 4-1/2" $\pm$ 3/16"

Maximum Diameter 1-23/32"

Bulb T-12

Cap Small (JETEC No. C1-1)

Base Short Jumbo-Shell Octal 8-Pin

with External Barriers (JETEC No. BB-71)

Basing Designation for BOTTOM VIEW 8GH

Pin 1 - Internal
Connection-
Do Not Use

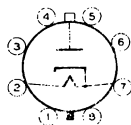
Pin 2 - Heater

Pin 3 - Same as Pin

Pin 4 - No

Connection

Pin 5 - Same as Pin 1



Pin 6 - Same as Pin 1

Pin 7 - Heater,

Cathode,

Internal

Shield

Pin 8 - Same as Pin 1

Cap. Plate

PULSED-RECTIFIER SERVICE

Maximum Ratings, Design-Center Values except as Noted:

For operation in a 420-line, 30-frame system¹

INVERSE PLATE VOLTAGE:

Total dc and peak

(Absolute maximum) 2500² max. voltsDC 2500² max. voltsPEAK PLATE CURRENT 50² max. ma

AVERAGE PLATE CURRENT 1.1 max. ma

^o without external shield.¹ See Operating Considerations.² As described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations", Federal Communications Commission.³ Under no circumstances should this absolute value be exceeded.

OPERATING CONSIDERATIONS

Socket Connections. Low-potential circuits should not be connected to any of the socket terminals. Any or all of the following socket terminal connections are permissible

JULY 1, 1955

TUBE DIVISION

TENTATIVE DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

3B2



3B2

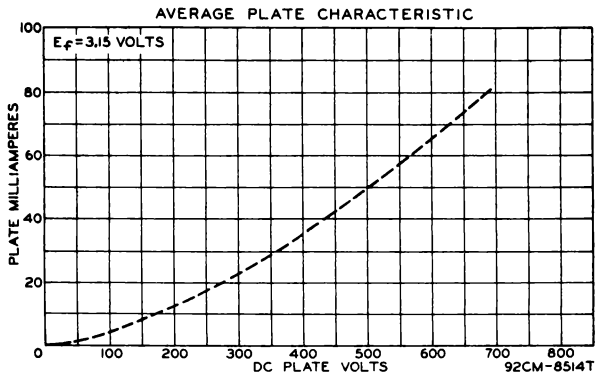
HALF-WAVE VACUUM RECTIFIER

and may aid in corona reduction.

1. Pins 1,3,5, and 7 may be connected together.
2. Pins 2,6, and 8 may be connected together.
3. Pin 4 may be connected to either pin 2 or pin 7, or may be used as a tie point for a heater-voltage dropping resistor. Do not use pin 4 as a low-potential tie point.

Measurement of Heater Voltage. To measure the heater voltage when the heater is at a high dc potential with respect to ground, it is recommended that a simple method utilizing visual comparison of the cathode and heater temperatures be used. The color temperature of the cathode and heater, with the heater operating from a pulse-power source, may be checked visually by comparing in a darkened room this color temperature with that obtained when the heater of another 3B2 is operated from a dc or low-frequency ac supply of 3.15 volts.

X-rays. The voltages employed in some television receivers and other high-voltage equipment are sufficiently high that high-voltage rectifier tubes may produce X-rays which can constitute a health hazard unless such tubes are adequately shielded. Relatively simple shielding should prove adequate, but the need for this precaution should be considered in equipment design.



JULY 1, 1955

TUBE DIVISION

TENTATIVE DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

**3BC5****SHARP-CUTOFF PENTODE**

7-PIN MINIATURE TYPE

*Intended for use in equipment having
series heater-string arrangement***3BC5
TO
3BY6***The 3BC5 is the same as the 6BC5 except for the following items:*

Heater, for Unipotential Cathode:

Voltage	3.15		ac or dc volts
Current	0.6		amp
Warm-up time (Average)* .	11		sec

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode .	200 max.	volts
Heater positive with respect to cathode .	200 [▲] max.	volts

3BN6**BEAM TUBE**

7-PIN MINIATURE TYPE

*Intended for limiter & discriminator service in FM & TV
equipment having series heater-string arrangement**The 3BN6 is the same as the 6BN6 except for the following items:*

Heater, for Unipotential Cathode:

Voltage	3.15		ac or dc volts
Current	0.6		amp
Warm-up time (Average)* .	11		sec

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode .	200 max.	volts
Heater positive with respect to cathode .	200 [▲] max.	volts

3BY6**PENTAGRID AMPLIFIER**

7-PIN MINIATURE TYPE

*Intended for use in equipment having
series heater-string arrangement**The 3BY6 is the same as the 6BY6 except for the following items:*

Heater, for Unipotential Cathode:

Voltage	3.15		ac or dc volts
Current	0.6		amp
Warm-up time (Average)* .	11		sec

** For definition of heater warm-up time and method of determining
it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of
this Section.*[▲] The dc component must not exceed 100 volts.

3BZ6
TO
3CF6



3BZ6

SEMIREMOTE-CUTOFF PENTODE

7-PIN MINIATURE TYPE

*Intended for use in equipment having
series heater-string arrangement*

The 3BZ6 is the same as the 6BZ6 except for the following items:

Heater, for Unipotential Cathode:

Voltage	3.15	ac or dc volts
Current	0.6	amp
Warm-up time (Average)* .	11	sec

3CB6

SHARP-CUTOFF PENTODE

7-PIN MINIATURE TYPE

*Intended for use in equipment having
series heater-string arrangement*

The 3CB6 is the same as the 6CB6 except for the following items:

Heater, for Unipotential Cathode:

Voltage	3.15	ac or dc volts
Current	0.6	amp
Warm-up time (Average)* .	11	sec

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode .	300 max. volts
Heater positive with respect to cathode .	200 [▲] max. volts

3CF6

SHARP-CUTOFF PENTODE

7-PIN MINIATURE TYPE

*Intended for use in equipment having
series heater-string arrangement*

The 3CF6 is the same as the 6CF6 except for the following items:

Heater, for Unipotential Cathode:

Voltage	3.15	ac or dc volts
Current	0.6	amp
Warm-up time (Average)* .	11	sec

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode .	300 max. volts
Heater positive with respect to cathode .	200 [▲] max. volts

* For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

[▲] The dc component must not exceed 100 volts.

**3CF6****SHARP-CUTOFF PENTODE**

7-PIN MINIATURE TYPE

*Intended for use in equipment having
series heater-string arrangement***3CF6
TO
3DK6***The 3CF6 is the same as the 6CF6 except for the following items:*

Heater, for Unipotential Cathode:

Voltage 3.15 ac or dc volts

Current 0.6 amp

Warm-up time (Average)* . 11 sec

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode . 300 max. volts

Heater positive with respect to cathode . 200[▲] max. volts**3CS6****PENTAGRID AMPLIFIER**

7-PIN MINIATURE TYPE

*Intended for use in equipment having
series heater-string arrangement**The 3CS6 is the same as the 6CS6 except for the following items:*

Heater, for Unipotential Cathode:

Voltage 3.15 ac or dc volts

Current 0.6 amp

Warm-up time (Average)* . 11 sec

3DK6**SHARP-CUTOFF PENTODE**

7-PIN MINIATURE TYPE

*Intended for use in equipment having
series heater-string arrangement**The 3DK6 is the same as the 6DK6 except for the following items:*

Heater, for Unipotential Cathode:

Voltage 3.15 ac or dc volts

Current $0.6 \pm 6\%$ amp

Warm-up time (Average)* . 11 sec

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode . 300 max. volts

Heater positive with respect to cathode . 200[▲] max. volts** For definition of heater warm-up time and method of determining
it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of
this Section.*[▲] The dc component must not exceed 100 volts.

3DT6



3DT6

SHARP-CUTOFF PENTODE

7-PIN MINIATURE TYPE

*Intended for use in equipment having
series heater-string arrangement*

The 3DT6 is the same as the 6DT6 except for the following items:

Heater, for Unipotential Cathode:

Voltage 3.15 ac or dc volts

Current 0.6 amp

Warm-up time (Average). . . 11 sec

*For definition of heater warm-up time and method of determining
it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of
this Section.*



3LF4

BEAM POWER AMPLIFIER

3LF4

GENERAL DATA**Electrical:**

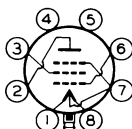
Filament, Coated:

<i>Filament Arrangement</i>	<i>Series*</i>	<i>Parallel**</i>	
Voltage.	2.8	1.4	.. dc volts
Current.	0.05	0.1	 amp

Mechanical:

Mounting Position.	Any
Maximum Overall Length	2-25/32"
Maximum Seated Length	2-1/4"
Maximum Diameter	1-3/16"
Bulb	T-9
Base	Lock-in 8-Pin
Basing Designation for BOTTOM VIEW	6BB

Pin 1-Filament
Pin 2-Plate
Pin 3-Grid No.2
Pin 4-No
Connection
Pin 5-No
Connection



Pin 6-Grid No.1
Pin 7-Filament
Mid-Tap,
Grid No.3
Pin 8-Filament
Plug -Base
Shell

AF POWER AMPLIFIER - Class A1**Maximum Ratings, Design-Center Values:**

<i>Filament Arrangement</i>	<i>Series*</i>	<i>Parallel**</i>	
PLATE VOLTAGE.	110 max.	110 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	110 max.	110 max.	volts
TOTAL CATHODE CURRENT.	6 max.	12 max.	ma

*Typical Operating Conditions and Characteristics
are the same as those for Type 3Q5-GT.*

*Curves shown under Type 1Q5-GT also apply to the 3LF4
with filaments connected in parallel.*

* A resistor of 270 ohms must be used in parallel with the negative section of the filament (Pins 7 and 8) in order to insure that the value of 6.0 Ma. total cathode current for each 1.4-volt section of the filament is not exceeded. When other tubes in series filament circuits contribute to the filament current of the 3LF4, an additional shunt resistor between pins 1 and 8 will be required.

** For parallel operation, connect pins 1 and 8 to the positive of the voltage supply and pin 7 to the negative.



3Q4



3Q4

POWER AMPLIFIER PENTODE

MINIATURE TYPE

Filament	Coated		
Filament Arrangement	<u>Series*</u>	<u>Parallel*</u>	
Voltage	2.8	1.4	d-c volts
Current	0.05	0.1	amp.
Maximum Overall Length			2-1/8"
Maximum Seated Height			1-7/8"
Maximum Diameter			3/4"
Bulb			T-5-1/2
Base ▲			Miniature Button 7-Pin
Pin 1—Fil. (—series)			Pin 5—Filament Mid-Tap
Pin 2—Plate			(—parallel)
Pin 3—Grid			Pin 6—Plate
Pin 4—Screen			Pin 7—Filament+
Mounting Position			Any



BOTTOM VIEW (7BA)

AMPLIFIER

Filament Arrangement	<u>Series*</u>	<u>Parallel*</u>	
Plate Voltage	90 max.	90 max.	volts
Screen Voltage	90 max.	90 max.	volts
Total Cathode Current	6*max.	12 max.	ma.

Typical Operation and Characteristics - Class A₁ Amplifier:

Plate Voltage	90	85	90	volts
Screen Voltage	90	85	90	volts
Grid Voltage	-4.5	-5	-4.5	volts
Peak A-F Grid Volt.	4.5	5	4.5	volts
Zero-Sig. Plate Cur.	7.7	6.9	9.5	ma.
Zero-Sig. Screen Cur.	1.7	1.5	2.1	ma.
Plate Res. (approx.)	0.12	0.12	0.1	megohm
Transconductance	2000	1975	2150	μmhos
Load Resistance	10000	10000	10000	ohms
Total Harmonic Dist.	7	10	7	%
Max.—Sig. Power Output	0.24	0.25	0.27	watt

* For series filament arrangement, filament voltage is applied between pins No.1 and No.7. The grid voltage is referred to pin No.1.

For parallel filament arrangement, filament voltage is applied between pin No.5 and pins No.1 and No.7 connected together. The grid voltage is referred to pin No.5.

For each 1.4-volt filament section. For series operation of the sections, a shunting resistor must be connected across the section between pins No.1 and No.5 to by-pass any cathode current in this section which is in excess of the rated maximum per section. When other tubes in a series-filament arrangement contribute to the filament current of the 3Q4, an additional shunting resistor may be required between pins No.1 and No.7.

▲ The center hole in sockets designed for this base provides for the possibility that this tube type may be manufactured with the exhaust-tube tip at the base end. For this reason, it is recommended that in equipment employing this tube type, no material be permitted to obstruct the socket hole.

May 1, 1941

RCA RADIODRON DIVISION
RCA MANUFACTURING COMPANY INC.

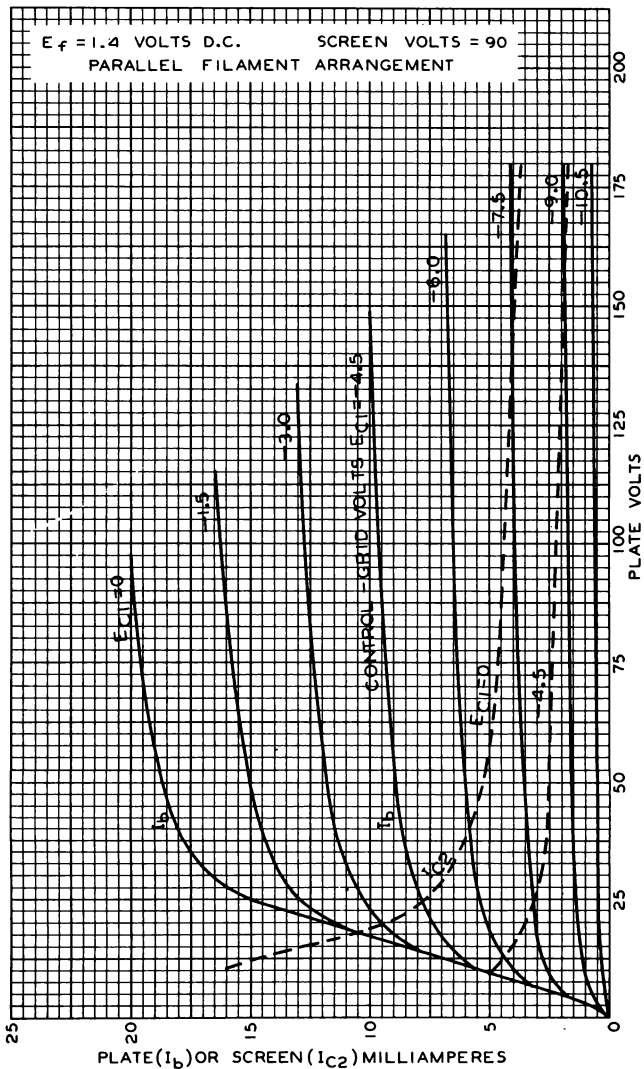
TENTATIVE DATA

3Q4



3Q4

AVERAGE PLATE CHARACTERISTICS



APR. 22, 1941

TUBE DIVISION

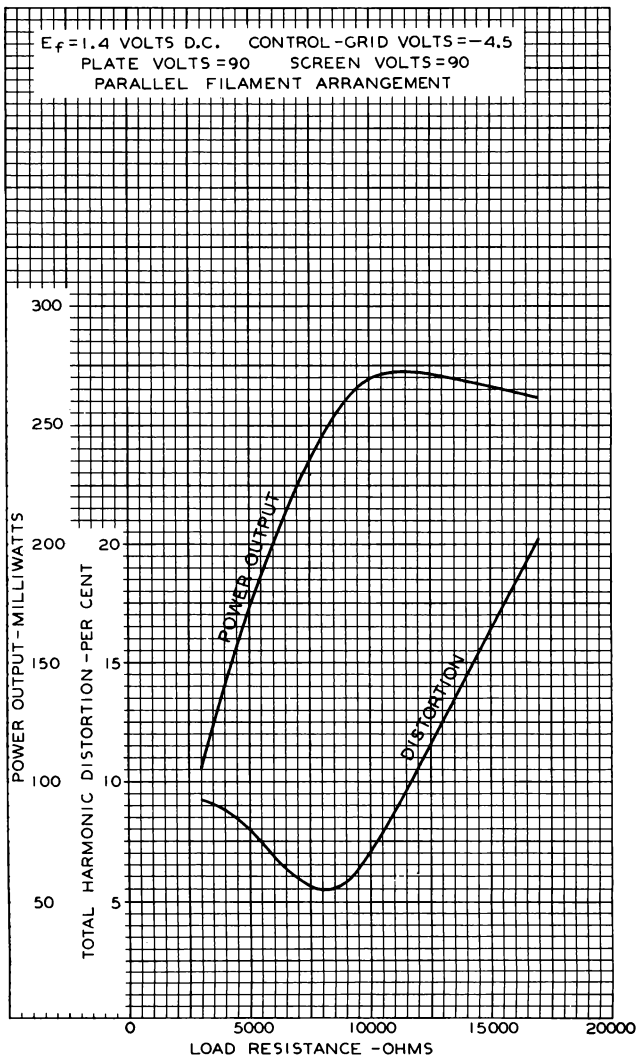
92C-6255 R1



3Q4

3Q4

OPERATION CHARACTERISTICS



MAY 7, 1941

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92C-6281

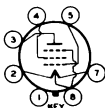
3Q5-GT/G



3Q5-GT/G

BEAM POWER AMPLIFIER

Filament	Coated Series*	Parallel**	
Filament Arrangement	2.8	1.4	d-c volts
Voltage	0.05	0.1	amp.
Current	Direct Interelectrode Capacitances (Approx.): ^o		
Grid to Plate	0.6		μf
Input	8.0		μf
Output	6.5		μf
Maximum Overall Length			3-5/16"
Maximum Seated Height			2-3/4"
Maximum Diameter			1-5/16"
Bulb			T-9
Base			Intermediate Shell Octal 7-Pin
Pin 1 - No Connection			Pin 5 - Grid
Pin 2 - Filament			Pin 7 - Fil. (-, series)
Pin 3 - Plate			Pin 8 - Fil. (-, parallel)
Pin 4 - Screen			
Mounting Position			Any



BOTTOM VIEW (G-7AP)

Maximum Ratings Are Design-Center Values
AMPLIFIER

Filament Arrangement	Series*	Parallel**	
Plate Voltage	110 max.	110 max.	volts
Screen Voltage	110 max.	110 max.	volts
Total Zero-Sig. Cath. Cur. 6#max.		12 max.	ma.

→ Typical Operation and Characteristics—Class A₁ Amplifier:

Plate	90	110	85	90	110	volts
Screen	90	110	85	90	110	volts
Grid ▲	-4.5	-6.6	-5	-4.5	-6.6	volts
Peak A-F Grid Voltage	4.5	5.1	5	4.5	5.4	volts
Plate Cur.	8.0	8.5	7.0	9.5	10	ma.
Screen Cur. (approx.)	1.0	1.1	0.8	1.3	1.4	ma.
Plate Res. (approx.)	80000	110000	70000	90000	100000	ohms
Transcond.	2000	2000	1950	2200	2200	μmhos
Load Res.	8000	8000	9000	8000	8000	ohms
Tot. Harm. Dist.	8.5	8.5	5.5	6.0	6.0	%
Max.-Sig. Power Output	230	330	250	270	400	mw.

* Filament voltage applied across the two sections in series between pins No.2 and No.7. Grid voltage is referred to pin No.7.

** Filament voltage applied across the two sections in parallel between pin No.8 and pins No.2 and No.7 connected together. Grid voltage is referred to pin No.8.

For each 1.4-volt filament section. For series operation of the sections, a shunting resistor must be connected across the section between pins No.7 and No.8 to by-pass any cathode current in excess of the rated maximum per section. When other tubes in series-filament arrangement contribute to the filament current of the 3Q5-GT/G, an additional shunting resistor may be required between pins No.2 and No.7.

▲ The grid circuit resistance should not exceed 1.0 megohm for either cathode bias or fixed bias operation.

• With a peak a-f grid voltage equal to the grid bias, the power output for the 110-volt condition is: 500 mw at 10% total harmonic distortion for parallel filament operation; and 400 mw at 10% total harmonic distortion for series filament operation.

° With no external shield.

Curves shown under Type 1Q5-GT/G also apply to the 3Q5-GT/G with the filaments connected in parallel.

← Indicates a change.

May 1, 1942

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

DATA



3S4

POWER PENTODE

MINIATURE TYPE

3S4

GENERAL DATA

Electrical:

Filament, Coated:

Filament arrangement	Series*	Parallel**	
Voltage	2.8	1.4	volts
Current	0.05	0.1	amp

Direct Interelectrode Capacitances:^o

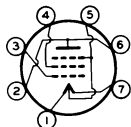
Grid No.1 to plate	0.3	μ f
Grid No.1 to filament (mid-tap) & grid No.3, and grid No.2.	4.8	μ f
Plate to filament (mid-tap) & grid No.3, and grid No.2.	4	μ f

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip)	1-1/2" $\pm$ 3/32"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base	Small-Button Miniature 7-Pin (JETEC No.E7-1)

Basing Designation for BOTTOM VIEW 7BA

Pin 1 - Filament
(-series)
Pin 2 - Plate
Pin 3 - Grid No.1
Pin 4 - Grid No.2



Pin 5 - Filament
Mid-Tap
(-parallel),
Grid No.3
Pin 6 - Plate
Pin 7 - Filament (+)

AMPLIFIER - Class A₁

Maximum Ratings, Design-Center Values:

	Series*	Parallel**	
PLATE VOLTAGE	90 max.	90 max.	volts
GRID-No.2 (SCREEN) VOLTAGE	67.5 max.	67.5 max.	volts
TOTAL MAXIMUM-SIGNAL CATHODE CURRENT	6 [#] max.	12 max.	ma
TOTAL ZERO-SIGNAL CATHODE CURRENT	4.5 [#] max.	9 max.	ma

Typical Operation and Characteristics:

	Series*	Parallel**	
Plate Voltage	67.5 90	67.5 90	volts
Grid-No.2 Voltage	67.5 67.5	67.5 67.5	volts

^o Without external shield.

[#] For each 1.4-volt filament section. For series operation of the sections, a shunting resistor must be connected across the section between pins No.1 and No.5 to bypass any cathode current in excess of the rated maximum per section. When other tubes in series filament arrangement contribute to the filament current of the 3S4, an additional shunting resistor may be required between pins No.1 and No.7.

*, **: See next page.

← indicates a change.

JAN. 3, 1955

TUBE DIVISION

DATA

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

354



354

POWER PENTODE

	Series*		Parallel**		
→ Grid-No.1 (Control-Grid)					
Voltage	-7	-7	-7	-7	volts
Peak AF Grid-No.1					
Voltage	7	7	7	7	volts
Zero-Sig. Plate Current . .	6	6.1	7.2	7.4	ma
Zero-Sig. Grid-No.2 Current .	1.2	1.1	1.5	1.4	ma
Plate Resistance (Approx.) .	0.1	0.1	0.1	0.1	megohm
Transconductance	1400	1425	1550	1575	μmhos
Load Resistance	5000	8000	5000	8000	ohms
Total Harmonic Distortion .	12	13	10	12	%
Max.-Sig. Power Output . . .	160	235	180	270	mW
→ Maximum Circuit Values (For maximum rated conditions):					
Grid-No.1-Circuit Resistance:					
For fixed-bias operation			2.2 max.		megohms
For cathode-bias operation			2.2 max.		megohms
→ Typical Operation with Single Filament Section:*					
Filament Voltage			1.4		volts
Filament Current			0.05		amp
Plate Voltage			90		volts
Grid-No.2 Voltage			67.5		volts
Grid-No.1 Voltage			-7		volts
Peak AF Grid-No.1 Voltage			7		volts
Zero-Signal Plate Current			3.7		ma
Zero-Signal Grid-No.2 Current			0.7		ma
Plate Resistance (Approx.)			0.2		megohm
Transconductance			800		μmhos
Load Resistance			16000		ohms
Total Harmonic Distortion			12		%
Maximum-Signal Power Output			145		mW
→ Maximum Circuit Values (For maximum rated conditions):					
Grid-No.1-Circuit Resistance:					
For fixed-bias operation			2.2 max.		megohms
For cathode-bias operation			2.2 max.		megohms
* Filament voltage applied across the two sections in series between pins No.1 and No.7. Grid-No.1 voltage is referred to pin No.1.					
** Filament voltage applied across the two sections in parallel between pin No.5 and pins No.1 and No.7 connected together. Grid-No.1 voltage is referred to pin No.5.					
• Either filament section may be operated singly with the other section floating. It is to be noted, however, that such operation may impair the emission capabilities of the unused section. Although in subsequent operation the unused section may be operated in series with the used section, it should not be operated singly.					
Curves shown under Type 1S4 also apply to the 3S4 with the filaments connected in parallel					
→ Indicates a change.					



3V4

POWER PENTODE

MINIATURE TYPE

3V4

GENERAL DATA

Electrical:

Filament, Coated:

Filament arrangement	Series*	Parallel**	
Voltage.	2.8	1.4	volts
Current.	0.05	0.1	amp

Direct Interelectrode Capacitances (Approx.):^o

Grid No.1 to plate	0.20	μf
Grid No.1 to filament (mid-tap) & grid No.3, and grid No.2	5.5	μf
Plate to filament (mid-tap) & grid No.3, and grid No.2	3.8	μf

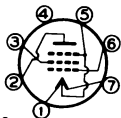
Mechanical:

Mounting Position.	Any
Maximum Overall Length	2-1/8"
Maximum Seated Length	1-7/8"
Length, Base Seat to Bulb Top (Excluding tip).	1-1/2" ± 3/32"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base	Small-Button Miniature 7-Pin (JETEC No.E7-1)
Basing Designation for BOTTOM VIEW	6BX

Pin 1 - Filament
(-series)

Pin 2 - Plate

Pin 3 - Grid No.2

Pin 4 - No Connec-
tion-Do Not Use

Pin 5 - Filament

Mid-Tap

(-parallel),

Grid No.3

Pin 6 - Grid No.1

Pin 7 - Filament (+)

AMPLIFIER - Class A₁

Maximum Ratings, Design-Center Values:

	Series*	Parallel**	
PLATE VOLTAGE.	90 max.	90 max.	volts
GRID-No.2 (SCREEN) VOLTAGE . .	90 max.	90 max.	volts
TOTAL MAXIMUM-SIGNAL CATHODE CURRENT.	6#max.	12 max.	ma
TOTAL ZERO-SIGNAL CATHODE CURRENT.	6#max.	12 max.	ma

Typical Operation and Characteristics:

	Series*	Parallel**	
Plate Voltage.	90	85 90	volts
Grid-No.2 Voltage.	90	85 90	volts

^o Without external shield.

For each 1.4-volt filament section. For series operation of the sections, a shunting resistor must be connected across the section between pins No.1 and No.5 to bypass any cathode current in excess of the rated maximum per section. When other tubes in series filament arrangement contribute to the filament current of the 3V4, an additional shunting resistor may be required between pins No.1 and No.7.

*, **: See next page.

← Indicates a change.

3V4



3V4

POWER PENTODE

	Series*	Parallel**		
Grid-No.1 (Control-Grid)				
Voltage.	-4.5	-5	-4.5	volts
Peak AF Grid-No.1				
Voltage.	4.5	5	4.5	volts
Zero-Sig. Plate Current. . . .	7.7	6.9	9.5	ma
Zero-Sig. Grid-No.2 Current. .	1.7	1.5	2.1	ma
Plate Resistance (Approx.) . .	0.12	0.12	0.1	megohm
Transconductance	2000	1975	2150	μmhos
Load Resistance	10000	10000	10000	ohms
Total Harmonic Distortion. . .	7	10	7	%
Max.-Signal Power Output . . .	240	250	270	mw

→ **Maximum Circuit Values (For maximum rated conditions):**

Grid-No.1-Circuit Resistance:

For fixed-bias operation	2.2 max.	megohms
For cathode-bias operation	2.2 max.	megohms

→ **Typical Operation with Single Filament Section:***

Filament Voltage	1.4	volts
Filament Current	0.05	amp
Plate Voltage.	90	volts
Grid-No.2 Voltage.	90	volts
Grid-No.1 Voltage.	-4.5	volts
Peak AF Grid-No.1 Voltage.	4.5	volts
Zero-Signal Plate Current.	4.8	ma
Zero-Signal Grid-No.2 Current.	1.1	ma
Plate Resistance (Approx.)	0.2	megohm
Transconductance	1100	μmhos
Load Resistance.	20000	ohms
Total Harmonic Distortion.	7	%
Maximum-Signal Power Output.	135	mw

→ **Maximum Circuit Values (For maximum rated conditions):**

Grid-No.1-Circuit Resistance:

For fixed-bias operation	2.2 max.	megohms
For cathode-bias operation	2.2 max.	megohms

* Filament voltage applied across the two sections in series between pins No.1 and No.7. Grid-No.1 voltage is referred to pin No.1.

** Filament voltage applied across the two sections in parallel between pin No.5 and pins No.1 and No.7 connected together. Grid-No.1 voltage is referred to pin No.5.

• Either filament section may be operated singly with the other section floating. It is to be noted, however, that such operation may impair the emission capabilities of the unused section. Although in subsequent operation the unused section may be operated in series with the used section, it should not be operated singly.

Curves shown under Type 3Q4 also apply to the 3V4

→ Indicates a change.



4BC8
TO
4BZ7

4BC8

MEDIUM-MU TWIN TRIODE
With Semiremote-Cutoff Characteristic

9-PIN MINIATURE TYPE

*Intended for use in equipment having
series heater-string arrangement*

The 4BC8 in the same as the 6BC8 except for the following items:

Heater, for Unipotential Cathodes:

Voltage	4.2	ac or dc volts
Current	0.6	amp
Warm-up time (Average)* .	11	sec

4BQ7-A

MEDIUM-MU TWIN TRIODE

9-PIN MINIATURE TYPE

*Intended for use in equipment having
series heater-string arrangement*

The 4BQ7-A is the same as the 6BQ7-A except for the following items:

Heater, for Unipotential Cathodes:

Voltage	4.2	ac or dc volts
Current	0.6	amp
Warm-up time (Average)* .	11	sec

4BZ7

MEDIUM-MU TWIN TRIODE

9-PIN MINIATURE TYPE

*Intended for use in equipment having
series heater-string arrangement*

The 4BZ7 is the same as the 6BZ7 except for the following items:

Heater, for Unipotential Cathodes:

Voltage	4.2	ac or dc volts
Current	0.6	amp
Warm-up time (Average)* .	11	sec

* For definition of heater warm-up time and method of determining it, see sheet **HEATER WARM-UP TIME MEASUREMENT** at front of this Section.



5AM8

DIODE—SHARP-CUTOFF PENTODE

9-PIN MINIATURE TYPE

*Intended for use in equipment having
series heater-string arrangement*

The 5AM8 is the same as the 6AM8 except for the following items:

Heater, for Unipotential Cathodes:

Voltage	4.7		ac or dc volts
Current	0.6		amp
Warm-up time (Average)* .	11		sec

5AN8

.MEDIUM-MU TRIODE— SHARP-CUTOFF PENTODE

9-PIN MINIATURE TYPE

*Intended for use in equipment having
series heater-string arrangement*

The 5AN8 is the same as the 6AN8 except for the following items:

Heater, for Unipotential Cathodes:

Voltage	4.7		ac or dc volts
Current	0.6		amp
Warm-up time (Average)* .	11		sec

5AQ5

BEAM POWER TUBE

7-PIN MINIATURE TYPE

*Intended for use in equipment having
series heater-string arrangement*

The 5AQ5 is the same as the 6AQ5 except for the following items:

Heater, for Unipotential Cathode:

Voltage	4.7		ac or dc volts
Current	0.6		amp
Warm-up time (Average)* .	11		sec

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode .	200 max.	volts
Heater positive with respect to cathode .	200 [▲] max.	volts

* For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.

[▲] The dc component must not exceed 100 volts.

5AM8
TO
5AQ5



5AS4

5AS4

FULL-WAVE VACUUM RECTIFIER

GENERAL DATA

Electrical:

Filament, Coated:

Voltage. 5 ac volts

Current. 3 amp

Mechanical:

Mounting Position. Vertical, base up or down, or
Horizontal with pins 1 and 4 in vertical plane

Maximum Overall Length 5-1/8"

Maximum Seated Length. 4-9/16"

Maximum Diameter 2-1/16"

Bulb ST-16

Base Medium-Shell Octal 8-Pin (JETEC No. B8-11),
or Medium-Shell Octal 5-Pin (JETEC No. B5-15)

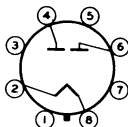
Basing Designation for BOTTOM VIEW 5T

Pin 1 - No Connection

Pin 2 - Filament

Pin 3 - Same as Pin 1

Pin 4 - Plate No. 2



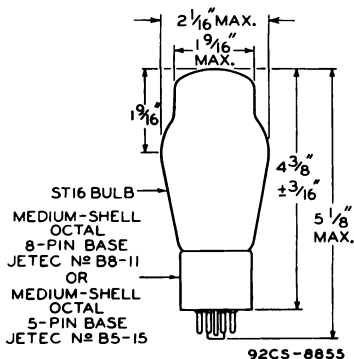
Pin 5 - Same as Pin 1

Pin 6 - Plate No. 1

Pin 7 - Same as Pin 1

Pin 8 - Filament

MAXIMUM RATINGS, TYPICAL OPERATION, and CURVES
for Type 5AS4 are the same as those shown for Type 5U4-GB





5AS8

DIODE-SHARP-CUTOFF PENTODE

9-PIN MINIATURE TYPE

*Intended for use in equipment having
series heater-string arrangement*

**5AS8
5AT8**

The 5AS8 is the same as the 6AS8 except for the following items:

Heater, for Unipotential Cathodes:

Voltage	4.7	 ac or dc volts
Current	0.6	 amp
Warm-up time (Average)* .	11	 sec

5AT8

TRIODE-PENTODE CONVERTER

9-PIN MINIATURE TYPE

*Intended for use in equipment having
series heater-string arrangement*

The 5AT8 is the same as the 6AT8 except for the following items:

Heater, for Unipotential Cathode:

Voltage	4.7	 ac or dc volts
Current	0.6	 amp
Warm-up time (Average)* .	11	 sec

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode .	200 max. volts
Heater positive with respect to cathode .	200 [▲] max. volts

** For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this Section.*

[▲] The dc component must not exceed 100 volts.

5AV8



5AV8

MEDIUM-MU TRIODE - SHARP-CUTOFF PENTODE

9-PIN MINIATURE TYPE

*Intended for use in equipment having
series heater-string arrangement*

The 5AV8 is the same as the 6AN8 except for the following items:

Heater, for Unipotential Cathodes:

Voltage 4.7 ac or dc volts

Current 0.6 amp

Warm-up time (Average). . . 11 sec

*For definition of heater warm-up time and method of determining
it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of
this Section.*

Base. Small-Button Noval 9-Pin (JETEC No.E9-1)

Basing Designation for BOTTOM VIEW. 9DZ

Pin 1 - Triode
Cathode

Pin 2 - Triode
Grid

Pin 3 - Triode Plate

Pin 4 - Heater

Pin 5 - Heater

Pin 6 - Pentode
Grid No.1



Pin 7 - Pentode
Cathode,
Pentode
Grid No.3,

Internal
Shield

Pin 8 - Pentode
Grid No.2

Pin 9 - Pentode Plate



5A Z4

FULL-WAVE VACUUM RECTIFIER

GENERAL DATA

Electrical:

Filament, Coated:

Voltage. 5 ac or dc volts

Current. 2 amp

Mechanical:

Mounting Position. Vertical, or Horizontal with pins
2 and 8 in horizontal plane

Maximum Overall Length. 3-5/32"

Maximum Seated Length. 2-5/8"

Maximum Diameter. 1-3/16"

Bulb T-9

Base Lock-in 8-Pin

Basing Designation for BOTTOM VIEW 5T

Pin 1-No

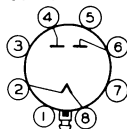
Connection

Pin 2-Filament

Pin 3-No

Connection

Pin 4-Plate



Pin 5-No

Connection

Pin 6-Plate

Pin 7-No

Connection

Pin 8-Filament

Plug -Base Shell

FULL-WAVE RECTIFIER

Maximum Ratings, Design-Center Values:

PEAK INVERSE PLATE VOLTAGE 1400 max. volts

PEAK PLATE CURRENT 375 max. ma

DC OUTPUT CURRENT. 125 max. ma

Typical Operation:

	Capacitor- Input to Filter	Choke- Input to Filter	
AC Plate-to-Plate Supply Voltage (RMS).	100	1000	volts
Filter Input Capacitor	4	-	μ f
Min. Total Effective Plate-Supply Impedance per Plate*.	50	-	ohms
Min. Filter Input Choke	-	5	henries
DC Output Current.	125	125	ma

* When the input capacitor of the filter exceeds 40 μ f, it may be necessary to increase the plate-supply impedance in order to limit the peak current to the rated value.



5CG8

TRIODE-PENTODE CONVERTER

9-PIN MINIATURE TYPE

*Intended for use in equipment having
series heater-string arrangement*

The 5CG8 is the same as the 6CG8 except for the following items:

Heater, for Unipotential Cathode:

Voltage	4.7	ac or dc volts
Current	0.6	amp
Warm-up time (Average)*.	11	sec

5CL8-A

MEDIUM-MU TRIODE— SHARP-CUTOFF TETRODE

9-PIN MINIATURE TYPE

*Intended for use as combined VHF oscillator and mixer
tube in TV receivers having series heater-string arrangement*

The 5CL8-A is the same as the 6CL8-A except for the following items:

Heater, for Unipotential Cathodes:

Voltage	4.7	ac or dc volts
Current	0.6	amp

5CQ8

MEDIUM-MU TRIODE— SHARP-CUTOFF TETRODE

9-PIN MINIATURE TYPE

*Intended for use in equipment having
series heater-string arrangement*

The 5CQ8 is the same as the 6CQ8 except for the following items:

Heater, for Unipotential Cathodes:

Voltage	4.7	ac or dc volts
Current	0.6	amp

* For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this section.

5CZ5



5CZ5

BEAM POWER TUBE

9-PIN MINIATURE TYPE

*For vertical-deflection-amplifier service in 110° systems
having series heater-string arrangement*

The 5CZ5 is the same as the 6CZ5 except for the following items:

Heater, for Unipotential Cathode:

Voltage	4.7	ac or dc volts
Current	0.6	 amp



5J6

MEDIUM-MU TWIN TRIODE

MINIATURE TYPE

*Intended for use in equipment having
series heater-string arrangement*

The 5J6 is the same as the 6J6 except for the following items:

Heater, for Unipotential Cathode:

Voltage	4.7		ac or dc volts
Current	0.6		amp
Warm-up time (Average). .	11		sec

*For definition of heater warm-up time and method of determining
it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of
this Section.*

PEAK HEATER-CATHODE VOLTAGE:

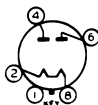
Heater negative with respect to cathode .	200 max.	volts
Heater positive with respect to cathode .	200 [▲] max.	volts

[▲] The dc component must not exceed 100 volts.



FULL-WAVE HIGH-VACUUM RECTIFIER

Filament	Coated	
Voltage	5.0	a-c volts
Current	2.0	amp.
Maximum Overall Length		4-5/16"
Maximum Diameter		1-5/8"
Bulb		Metal Shell, MT-10
Base		Small Wafer Octal 5-Pin
Pin 1 - Shell		Pin 6 - Plate #1
Pin 2 - Filament		Pin 8 - Filament
Pin 4 - Plate #2		
Mounting Position		Vertical $\diamond$

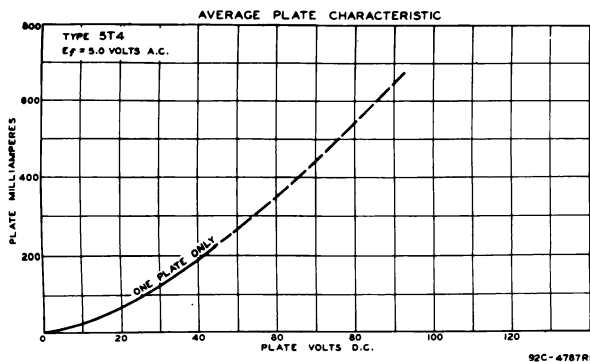


BOTTOM VIEW (5T)

FULL-WAVE RECTIFIER

Peak Inverse Voltage	1550 max. volts
Peak Plate Current per Plate	675 max. ma.
<i>Typical Operation with Condenser-Input Filter:</i>	
A-C Plate Voltage per Plate (RMS)	450 max. volts
Total Effective Plate-Supply Impedance per Plate Δ	150 min. ohms
D-C Output Current	225 max. ma.
<i>Typical Operation with Choke-Input filter:</i>	
A-C Plate Voltage per Plate (RMS)	550 max. volts
Input-Choke Inductance	3 min. henries
D-C Output Current	225 max. ma.

- $\diamond$ Horizontal operation permitted if pins 2 and 4 are in vertical plane.
 Δ When a filter-input condenser larger than 40 μ f is used, it may be necessary to use more plate-supply impedance than the minimum value shown to limit the peak plate current to the rated value.

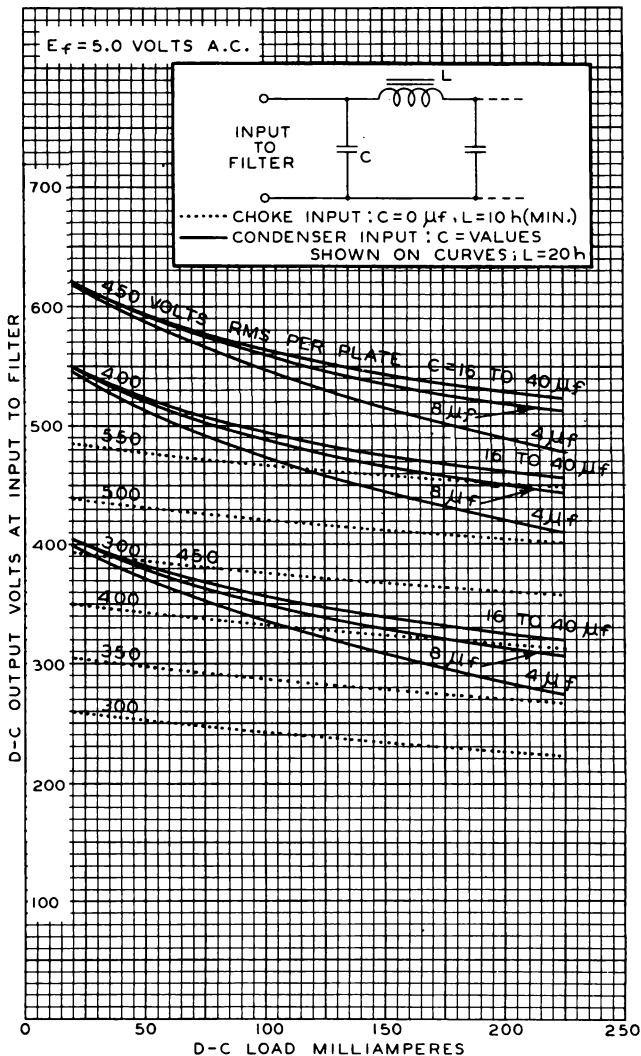


5T4



5T4

OPERATION CHARACTERISTICS



JAN. 12, 1940

RCA RADITRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-4697R3



5T8

5T8

TRIPLE DIODE—HIGH-MU TRIODE

9-PIN MINIATURE TYPE

*Intended for use in equipment having
series heater-string arrangement*

The 5T8 is the same as the 6T8 except for the following items:

Heater, for Unipotential Cathodes:

Voltage 4.7 ac or dc volts

Current 0.6 amp

Warm-up time (Average) 11 sec

*For definition of heater warm-up time and method of determining
it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of
this Section.*

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode 200 max. volts

Heater positive with respect to cathode 200[▲] max. volts

[▲] The dc component must not exceed 100 volts.



5U4-G

5U4-G

FULL-WAVE VACUUM RECTIFIER**GENERAL DATA****Electrical:**

Filament, Coated:

Voltage. 5 ac volts

Current. 3 amp

Mechanical:Mounting Position. Vertical, or Horizontal with pins
1 and 4 in vertical plane

Maximum Overall Length 5-5/16"

Maximum Seated Length. 4-3/4"

Maximum Diameter 2-1/16"

Bulb ST-16

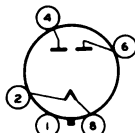
Base Medium-Shell Octal 5-Pin

Basing Designation for BOTTOM VIEW G-5T

Pin 1—No Connection

Pin 2—Filament

Pin 4—Plate No.2



Pin 6—Plate No.1

Pin 8—Filament

FULL-WAVE RECTIFIER**Maximum Ratings, Design-Center Values:**

PEAK INVERSE PLATE VOLTAGE 1550 max. volts

PEAK PLATE CURRENT PER PLATE 675 max. ma

AC PLATE SUPPLY

VOLTAGE (RMS) PER PLATE. See Rating Chart

DC OUTPUT CURRENT PER PLATE. See Rating Chart

HOT-SWITCHING TRANSIENT

PLATE CURRENT PER PLATE

For duration of 0.2 second maximum . . . 2.35 max. amp

Typical Operation with Capacitor-Input Filter:

AC Plate-to-Plate

Supply Voltage (RMS) 900 1100 volts

Filter-Input Capacitor^o. 10 10 μ f

Total Effect. Plate-Supply

Impedance Per Plate. 170 230 ohms

DC Output Voltage at Input

to Filter (Approx.):

At Half-Load Cur.of { 112.5 ma. . . 510 — volts

{ 78 ma. . . — 660 volts

At Full-Load Cur.of { 225 ma. . . 430 — volts

{ 156 ma. . . — 590 volts

Voltage Regulation, Half-Load

to Full-Load Current (Approx.) . . 80 70 volts

^o When a filter input capacitor larger than 10 μ f is used, it may be necessary to increase the effective plate-supply impedance in order not to exceed the hot-switching transient plate current.

←Indicates a change.

5U4-G



5U4-G

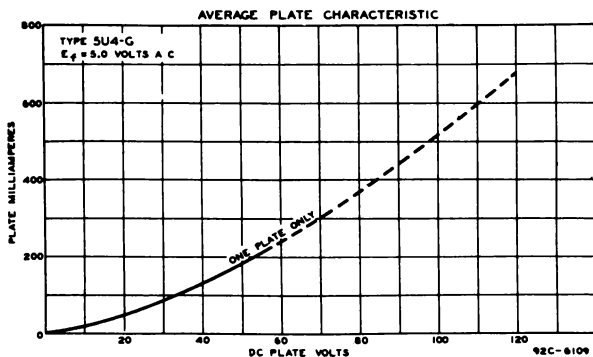
FULL-WAVE VACUUM RECTIFIER

→ Typical Operation with Choke-Input Filter:

AC Plate-to-Plate			
Supply Voltage (RMS)	900	1100	volts
Filter-Input Choke	10*	10**	henries
DC Output Voltage at Input to Filter (Approx.):			
At Half-Load Cur. of	135 ma. .	365	-
	112.5 ma. .	-	460
At Full-Load Cur. of	270 ma. .	345	-
	225 ma. .	-	440
Voltage Regulation, Half-Load to Full-Load Current (Approx.) .			
	20	20	volts

* This value is adequate to maintain optimum regulation in the region to the right of line L=10H on curve OPERATION CHARACTERISTICS with Choke-input to Filter, provided the load current is not less than 35 ma. For load currents less than 35 ma., a larger value of inductance is required for optimum regulation.

** This value is adequate to maintain optimum regulation in the region to the right of line L=10H on curve OPERATION CHARACTERISTICS with Choke-input to Filter, provided the load current is not less than 45 ma. For load currents less than 45 ma., a larger value of inductance is required for optimum regulation.



→ RATING CHART and OPERATION CHARACTERISTICS

The *Rating Chart* presents graphically the relationships between maximum ac voltage input and maximum dc output current derived from the fundamental ratings for conditions of capacitor-input and choke-input filters. This graphical presentation gives the equipment designer considerable latitude in choice of operating conditions.

The *Operation Characteristics for Full-Wave Circuit with Capacitor-Input Filter* show not only the typical operating curves for such a circuit, but also show by means of boundary lines "ADK" the limiting current and voltage relationships presented on the Rating Chart.

→ Indicates a change.

MARCH 1, 1951

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA 1



5U4-G

5U4-G

FULL-WAVE VACUUM RECTIFIER

The *Operation Characteristics for Full-Wave Circuit with Choke-Input Filter* show the typical operating curves for such a circuit. They not only show by means of boundary line "CEK" the limiting current and voltage relationships presented on the *Rating Chart*, but also give information as to the effect on regulation of various sizes of chokes. The solid-line curves show the dc voltage outputs which would be obtained if the filter chokes had infinite inductance. The long-dash lines radiating from the zero position are boundary lines for various sizes of chokes as indicated. The intersection of one of these lines with a solid-line curve indicates the point on the curve at which the choke no longer behaves as though it had infinite inductance. To the left of the choke boundary line, the regulation curves depart from the solid-line curves as shown by the representative short-dash regulation curves.

5U4-G

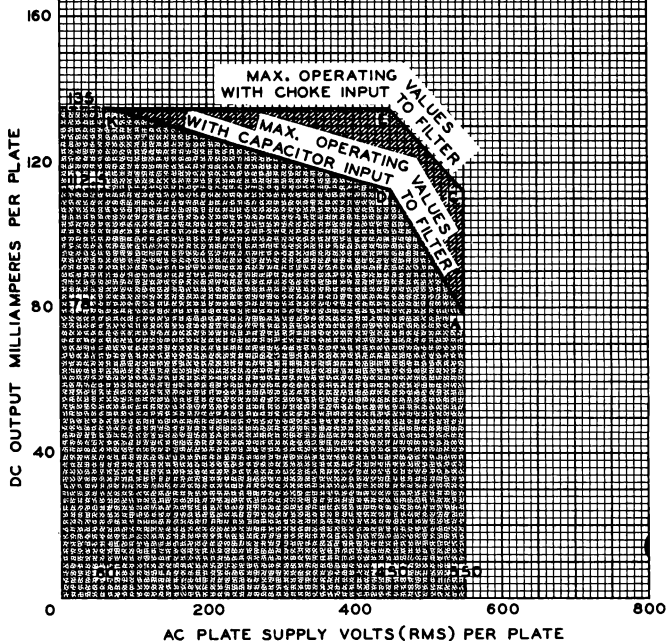


5U4-G RATING CHART

 $E_f = 5.0$ VOLTS


CAPACITOR OR
CHOKE INPUT
CHOKE INPUT
ONLY

FOR SUITABLE CHOKE VALUES,
SEE CURVE
"OPERATION CHARACTERISTICS
WITH CHOKE INPUT TO FILTER"



MAY 25, 1950

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

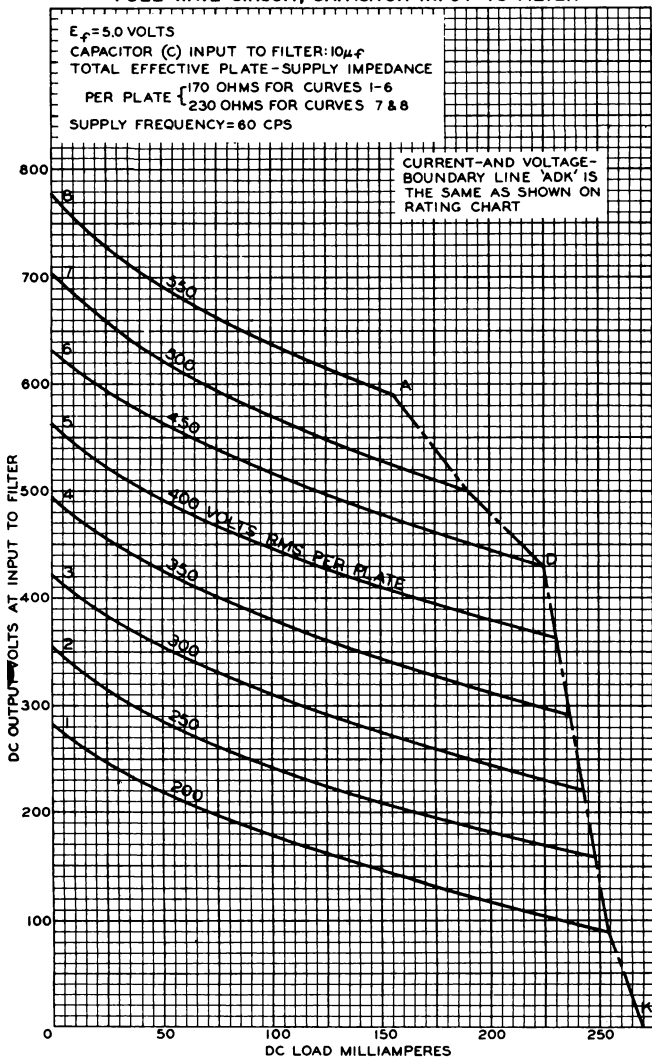
92CM-7494



5U4-G

5U4-G

OPERATION CHARACTERISTICS FULL-WAVE CIRCUIT, CAPACITOR INPUT TO FILTER



JULY 24, 1950

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

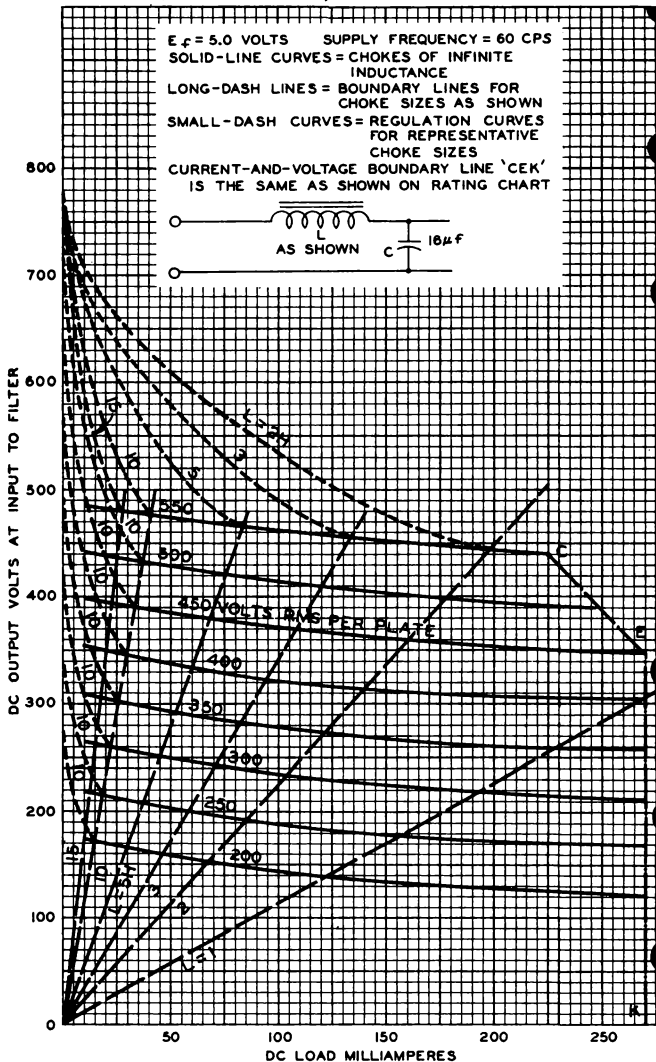
92CM-7497

5U4-G



5U4-G

OPERATION CHARACTERISTICS FULL-WAVE CIRCUIT, CHOKE INPUT TO FILTER



JULY 25, 1950

 TUBE DEPARTMENT
 RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7496



5U4-GB

5U4-GB

FULL-WAVE VACUUM RECTIFIER

GENERAL DATA

Electrical:

Filament, Coated:

Voltage 5 ac volts

Current 3 amp

Mechanical:

Mounting Position Vertical, base up or down, or
Horizontal with pins 2 and 4 in vertical plane

Maximum Overall Length 4-3/4"

Maximum Seated Length 4-3/16"

Maximum Diameter 1-23/32"

Bulb T-12

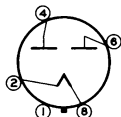
Base Flared Medium-Shell Octal 5-Pin
with External Barriers (JETEC No.B5-127)
or Short Medium-Shell Octal 5-Pin
with External Barriers (JETEC No.B5-121)

Basing Designation for BOTTOM VIEW G-5T

Pin 1—No Connection

Pin 2—Filament

Pin 4—Plate No.2



Pin 6—Plate No.1

Pin 8—Filament

FULL-WAVE RECTIFIER

Maximum Ratings, Design-Center Values:

PEAK INVERSE PLATE VOLTAGE 1550 max. volts

PEAK PLATE CURRENT PER PLATE 1 max. amp

AC PLATE SUPPLY VOLTAGE (RMS) PER PLATE . . See Rating Chart I

DC OUTPUT CURRENT PER PLATE See Rating Chart I

HOT-SWITCHING TRANSIENT PLATE

CURRENT PER PLATE See Operating Considerations

Typical Operation with Capacitor-Input to Filter:

AC Plate-to-Plate Supply

Voltage (RMS)	600	900	1100	volts
Filter-Input Capacitor [▲]	40	40	40	μf
Total Effective Plate-Supply Impedance Per Plate	21	67	97	ohms

DC Output Voltage at Input

to Filter (Approx.):

At full-load current of	300 ma	290	—	—	volts
275 ma	—	460	—	—	volts
162 ma	—	—	630	—	volts

[▲] When capacitance values higher than 40 μf are used, the effective plate-supply impedance should be increased so that the maximum rating for peak plate current is not exceeded.

5U4-GB



5U4-GB

FULL-WAVE VACUUM RECTIFIER

DC Output Voltage at Input

to Filter (Approx.):

At half-load current of 150 ma	335	-	-	volts
137.5 ma	-	520	-	volts
81 ma	-	-	680	volts

Voltage Regulation (Approx.):

Half-load to full-load current	45	60	50	volts
--	----	----	----	-------

Typical Operation with Choke-Input to Filter:

AC Plate-to-Plate Supply

Voltage (RMS)	900	1100	volts
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Filter-Input Choke 10 10 henries

DC Output Voltage at

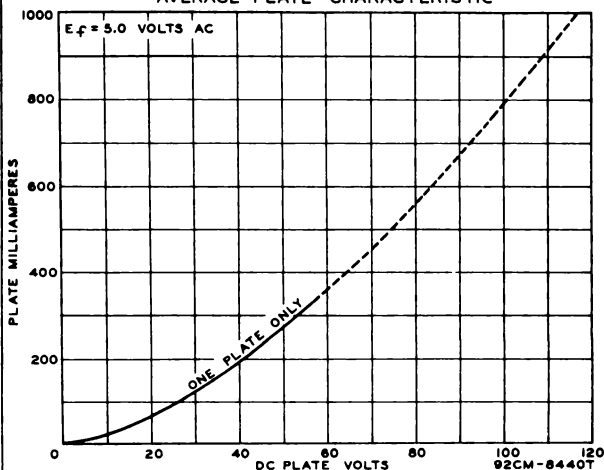
Input to Filter (Approx.):

At full-load current of 348 ma	340	-	volts
275 ma	-	440	volts
At half-load current of 174 ma	355	-	volts
137.5 ma	-	455	volts

Voltage Regulation (Approx.):

Half-load to full-load current	15	15	volts
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AVERAGE PLATE CHARACTERISTIC



OPERATING CONSIDERATIONS

Even occasional hot-switching with capacitor-input circuits permits the flow of plate current having magnitudes which can adversely affect tube life and reliability. If

NOV. 5, 1954

TUBE DIVISION

TENTATIVE DATA 1

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



5U4-GB

5U4-GB

FULL-WAVE VACUUM RECTIFIER

capacitor-input circuits are to be used, it is essential that the tube be protected against the possible adverse effects of hot-switching. The tube can be protected by circuits, designed to incorporate sufficient plate-supply resistance, as determined from Rating Chart III, to limit the maximum peak current value per plate to 4.6 amperes during the initial cycles of hot-switching operation. For applications in which hot-switching is required, choke-input circuits are recommended. Such circuits limit the hot-switching current to a value no higher than that of the peak plate current.

RATING CHARTS AND OPERATION CHARACTERISTICS

Rating Chart I represents graphically the relationships between maximum ac voltage input and maximum dc output current derived from the fundamental ratings for conditions of capacitor-input and choke-input filters. This graphical presentation gives the equipment designer considerable latitude in choice of operating conditions.

Rating Chart II represents graphically the relationship between maximum rectification efficiency and maximum dc output current per plate for conditions of capacitor-input to filter.

A choice of operating values of dc output current per plate and rectification efficiency should be made such that they fall within the area of permissible operation to insure that the maximum peak plate current will not be exceeded. If the operating values chosen fall outside the permissible operating area, a different choice of parameters should be made. For a given value of ac voltage input and dc output current, it is possible to reduce the rectification efficiency by either increasing the plate-supply resistance per plate or by using a smaller value of input filter capacitor.

Rating Chart III represents graphically the relationships between minimum plate-supply resistance per plate and maximum ac plate-supply voltage per plate under no-load conditions of capacitor-input filter when occasional hot-switching is employed.

If occasional hot-switching is required with capacitor-input circuits, it is important to protect the tube and the circuits against the flow of plate currents having magnitude in excess of the maximum permissible hot-switching current of 4.6 amperes. To limit the hot-switching current, adequate series plate-supply resistance per plate is necessary. The minimum value of this resistance may be determined from Rating Chart III. If the transformer windings do not provide this minimum value of resistance, then additional dc series resistance is required. The value of this dc resistance, R_A , may be determined from the relationship shown in the legend for Rating Chart III.

5U4-GB



5U4-GB

FULL-WAVE VACUUM RECTIFIER

If appreciable series inductance is present in the plate supply, a value of series plate-supply resistance smaller than that indicated by the curve may be employed provided it is experimentally determined that the combined effect of inductance and plate-supply resistance used are adequate to limit the hot-switching current to the indicated maximum value.

The *Operation Characteristics for Full-Wave Circuit with Capacitor-Input to Filter* show the usual typical operating curves for a full-wave rectifier with capacitor-input filter. In addition, they show by means of the boundary line "AED" the limiting current and voltage relationships presented in Rating Chart I. A choice of operating values to the left of the boundary line should be made such that the operation of the tube at these values will insure that the maximum ratings will not be exceeded.

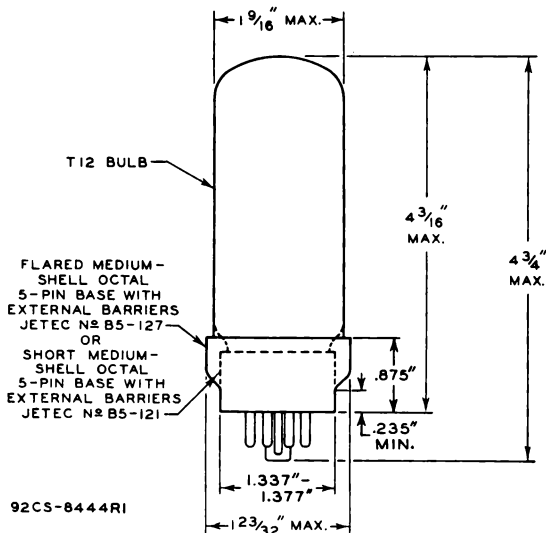
The *Operation Characteristics for Full-Wave Circuit with Choke-Input to Filter* show the usual typical operating curves for a full-wave rectifier with choke-input filter. They not only show by means of boundary line "ABC" the limiting current and voltage relationships presented in Rating Chart I, but also give information as to the effect of various sizes of chokes on regulation. The solid-line curves show the dc voltage outputs which would be obtained if the filter chokes had infinite inductance. The long-dash lines radiating from the zero position are boundary lines for various sizes of chokes as indicated. The intersection of one of these lines with a solid-line curve indicates the point on the curve at which the choke no longer behaves as though it had infinite inductance. To the left of the choke boundary line, the regulation curves depart from the solid-line curves as shown by the representative short-dash regulation curves. It will be noted that regulation improves with an increase in value of choke inductance, but for cost reasons, the value of inductance is usually held to the smallest value which will give the desired regulation over the operating current range. It is also to be noted that at the lower load currents, higher values of inductance are required to maintain good regulation. A choice of operating values to the left of the boundary line "ABC" should be made such that operation of the tube at these values will insure that the maximum ratings are not exceeded.



5U4-GB

FULL-WAVE VACUUM RECTIFIER

5U4-GB

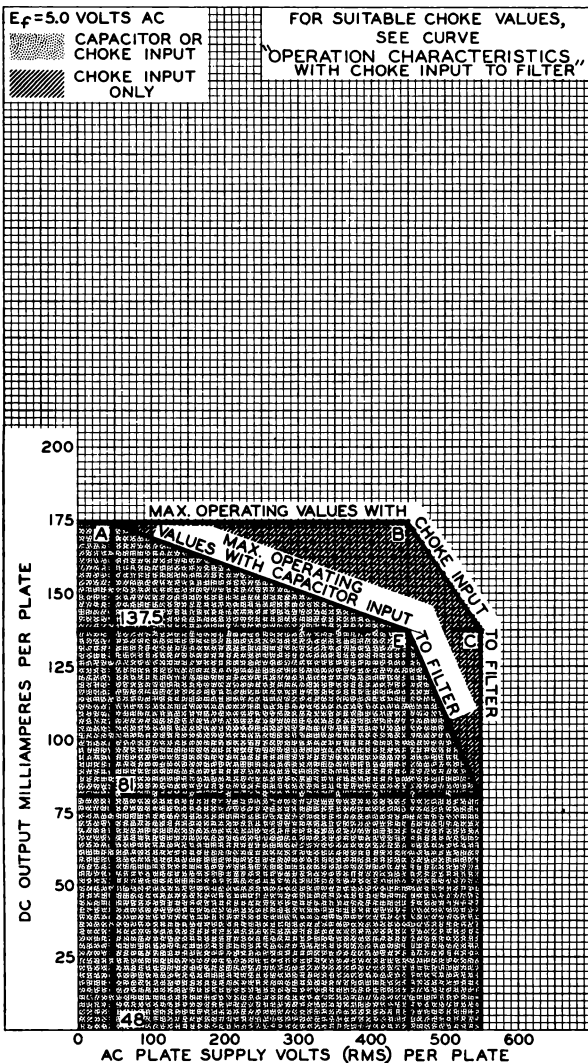


5U4-GB



5U4-GB

RATING CHART I



OCT. 5, 1954

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RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8450



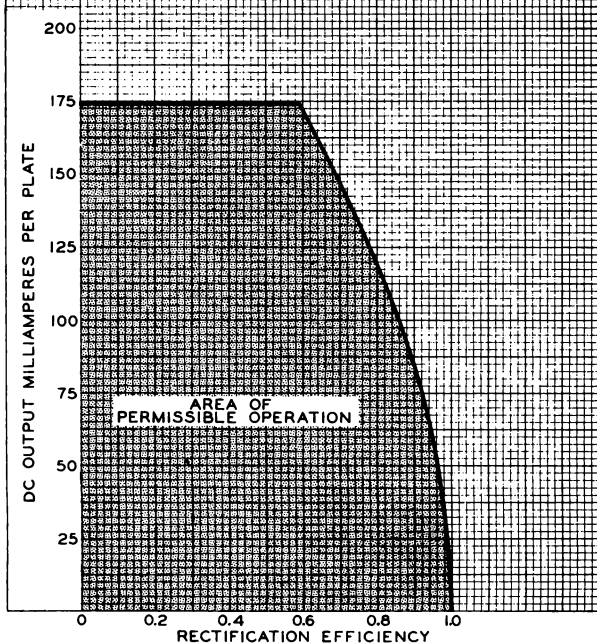
5U4-GB

5U4-GB

RATING CHART II
CAPACITOR INPUT TO FILTER $E_f = 5.0$ VOLTS AC

MAX. PEAK PLATE CURRENT PER PLATE = 1 AMP.

$$\text{RECTIFICATION EFFICIENCY} = \frac{\bar{E}}{\sqrt{2} E_s}$$

WHERE $\bar{E}$ = DC OUTPUT VOLTS AT INPUT TO FILTER
 E_s = AC PLATE SUPPLY VOLTS (RMS) PER PLATE

OCT. 5, 1954

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RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8451

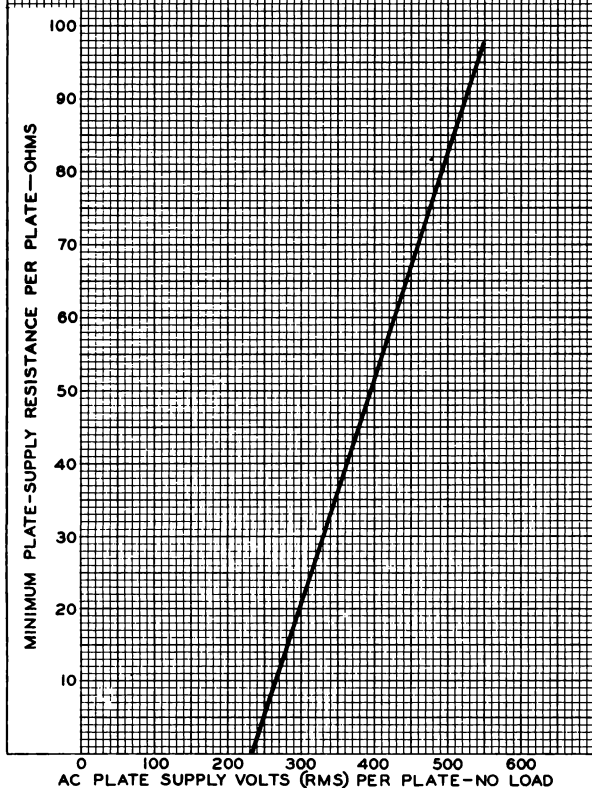
5U4-GB



5U4-GB

RATING CHART III CAPACITOR INPUT TO FILTER

$E_f = 5.0$ VOLTS AC MAX. HOT-SWITCHING CUR. = 4.6 AMP.
 PLATE-SUPPLY RESISTANCE PER PLATE = $R_{SEC} + N^2 R_{PRI} + R_A$
 WHERE R_{SEC} = DC RESISTANCE OF TRANSFORMER
 SECONDARY PER SECTION
 R_{PRI} = DC RESISTANCE OF TRANSFORMER
 PRIMARY
 R_A = DC RESISTANCE OF ADDED SERIES
 RESISTANCE PER PLATE
 N = TRANSFORMER VOLTAGE STEP-UP
 RATIO PER SECTION



OCT. 5, 1954

TUBE DIVISION
 RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-8452



5U4-GB

5U4-GB

OPERATION CHARACTERISTICS FULL-WAVE CIRCUIT, CAPACITOR INPUT TO FILTER

 $E_f = 5.0$ VOLTS AC

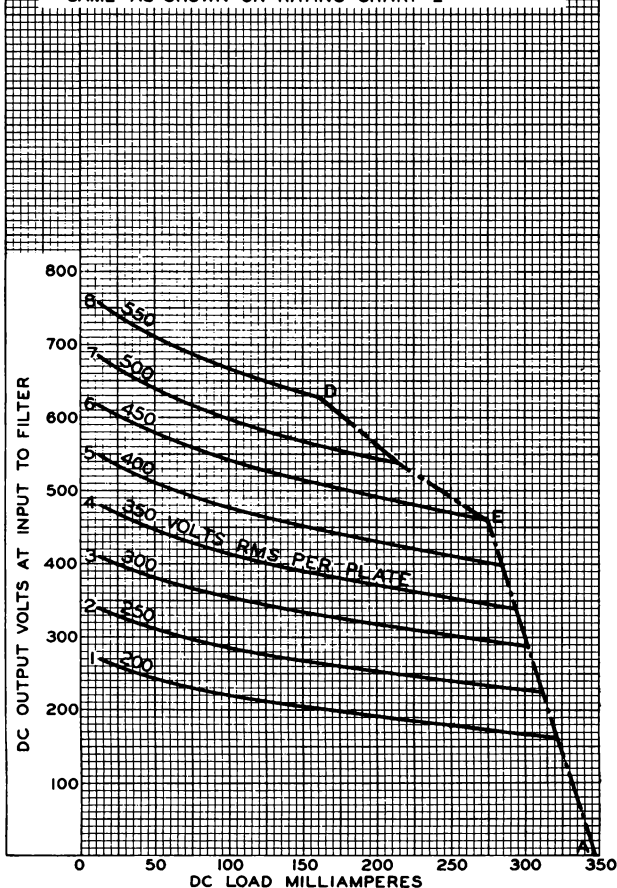
SUPPLY FREQUENCY=60CPS

CAPACITOR (C) INPUT TO FILTER: 40 μ F

TOTAL EFFECTIVE PLATE-SUPPLY IMPEDANCE

PER PLATE	CURVE	1	2	3	4	5	6	7	8
	OHMS	11	11	20	36	52	67	82	97

CURRENT-AND VOLTAGE BOUNDARY LINE 'DEA' IS THE SAME AS SHOWN ON RATING CHART I



OCT. 1, 1954

TUBE DIVISION

92CM-8446

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

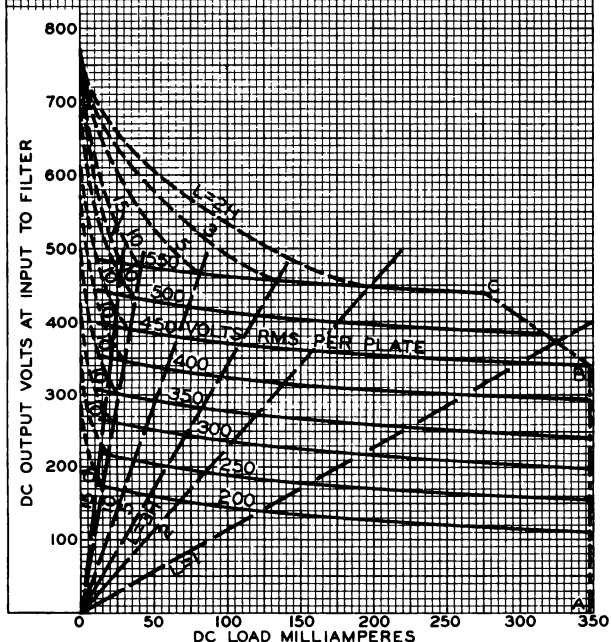
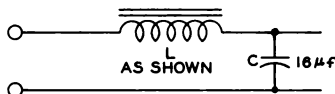
5U4-GB



5U4-GB

OPERATION CHARACTERISTICS FULL-WAVE CIRCUIT, CHOKE INPUT TO FILTER

$E_f = 5.0$ VOLTS AC SUPPLY FREQUENCY = 60 CPS
SOLID-LINE CURVES = CHOKES OF INFINITE INDUCTANCE
LONG-DASH LINES = BOUNDARY LINES FOR CHOKE SIZES AS SHOWN
SHORT-DASH CURVES = REGULATION CURVES FOR REPRESENTATIVE CHOKE SIZES
CURRENT-AND-VOLTAGE BOUNDARY LINE 'CBA' IS THE SAME AS SHOWN ON RATING CHART I





5U8

5U8

MEDIUM-MU TRIODE- SHARP-CUTOFF PENTODE

9-PIN MINIATURE TYPE

*Intended for use in equipment having
series heater-string arrangement*

The 5U8 is the same as the 6U8 except for the following items:

Heater, for Unipotential Cathodes:

Voltage 4.7 ac or dc volts

Current 0.6 amp

Warm-up time (Average). . . 11 sec

*For definition of heater warm-up time and method of determining
it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of
this Section.*

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode . . . 200 max. volts

Heater positive with respect to cathode . . . 200[▲]max. volts

[▲] The dc component must not exceed 100 volts.



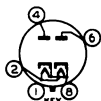
5V4-G



5V4-G

FULL-WAVE HIGH-VACUUM RECTIFIER

Heater	Coated Unipotential Cathode	
Voltage	5.0	a-c volts
Current	2.0	amp.
Maximum Overall Length		4-5/8"
Maximum Seated Height		4-1/16"
Maximum Diameter		1-13/16"
Bulb		ST-14
Base		Medium Shell Octal 5-Pin
Pin 1—No Connection		Pin 6—Plate #1
Pin 2—Heater		Pin 8—Heater & Cathode
Pin 4—Plate #2		
Mounting Position		Any



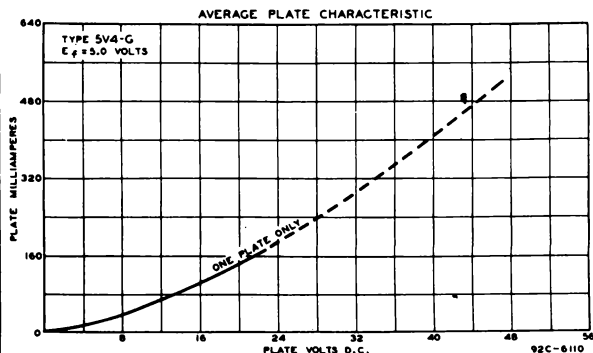
BOTTOM VIEW (G-5L)

FULL-WAVE RECTIFIER

Peak Inverse Voltage	1400 max. volts
Peak Plate Current per Plate	525 max. ma.
With Condenser-Input Filter:	
A-C Plate Voltage per Plate (RMS)	375 max. volts
Total Effective Plate-Supply Impedance per Plate Δ	100 min. ohms
D-C Output Current	175 max. ma.
With Choke-Input Filter:	
A-C Plate Voltage per Plate (RMS)	500 max. volts
Input-Choke Inductance	4 min. henries
D-C Output Current	175 max. ma.

Δ When a filter-input condenser larger than 40 μ f is used, it may be necessary to use more plate-supply impedance than the minimum value shown to limit the peak plate current to the rated value.

← Indicates a change.



Sept. 2, 1941

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

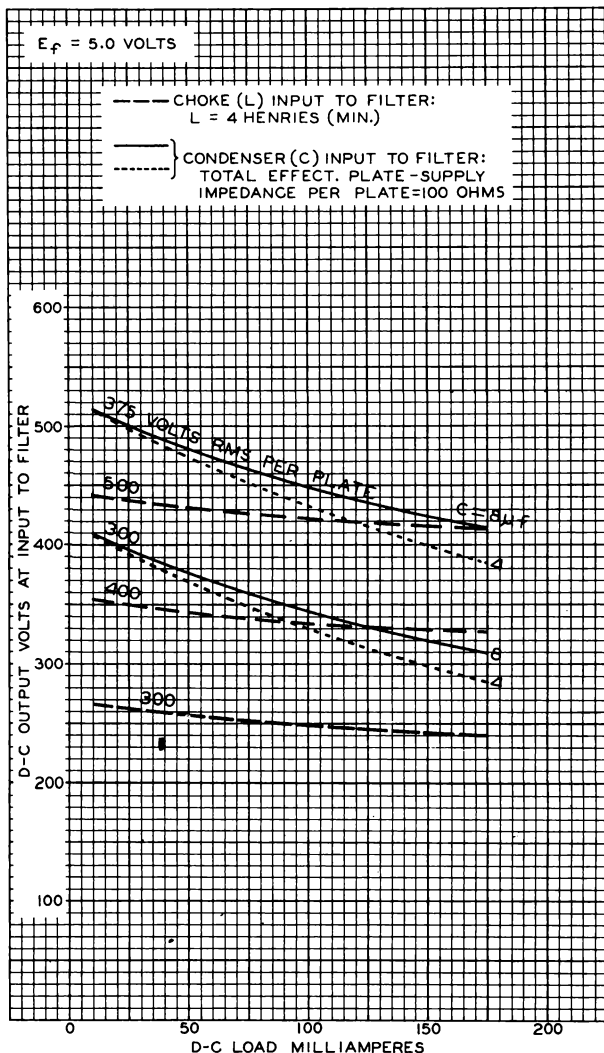
DATA

5V4-G



5V4-G

OPERATION CHARACTERISTICS



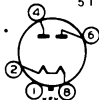


5W4, 5W4-GT/G

5W4
5W4-GT/G

FULL-WAVE HIGH-VACUUM RECTIFIER

Filament Voltage	Coated 5.0	a-c volts
Current	1.5	amp.
Maximum Overall Length	3-1/4"	5W4
Maximum Seated Height	2-11/16"	5W4-GT/G
Maximum Diameter	1-5/16"	
Bulb	Metal Shell, MT-8	
Base	{ Small Wafer Octal 5-Pin	{ Intermed. Sh. Octal 5-Pin
Basing Designation	5T	G-5T
Pin 1 { 5W4, Shell		Pin 4 - Plate #2
Pin 2 { 5W4-GT/G, No Con.		Pin 6 - Plate #1
Pin 2 - Filament		Pin 8 - Filament
Mounting Position		Vertical



BOTTOM VIEW

Maximum Ratings Are Design-Center Values

FULL-WAVE RECTIFIER

Peak Inverse Plate Voltage	1400 max. volts
Peak Plate Current per Plate	300 max. ma.
D-C Output Current:	
With condenser input to filter	100 max. ma.
With choke input to filter	100 max. ma.

Typical Operation:

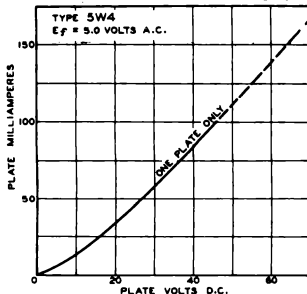
	Condenser- Input Filter	Choke- Input Filter
A-C Plate-to-Plate Supply Voltage (RMS)	700	1000 volts
Filter Input Condenser	4	- μ f
Min. Total Effect. Plate-Supply Imped. per Plate	50	- ohms
Filter Input Choke	-	6 henries
D-C Output Current	100	100 ma.
D-C Voltage (At input to filter):*		
At half-load current (50 ma.)	410	420 volts
At full-load current (100 ma.)	360	405 volts
Difference (Voltage Regulation)	50	15 volts
Percentage Regulation	12	3.5 %

◊ Horizontal operation of the 5W4 permitted if pins 2 and 8 are in a vertical plane. Horizontal operation of the 5W4-GT/G permitted if pins 2 and 8 are in a horizontal plane.

• For choke not less than 6 henries.

* Approximate values.

AVERAGE PLATE CHARACTERISTIC



← Indicates a change.

92C-6008R1

Mar. 20, 1943

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

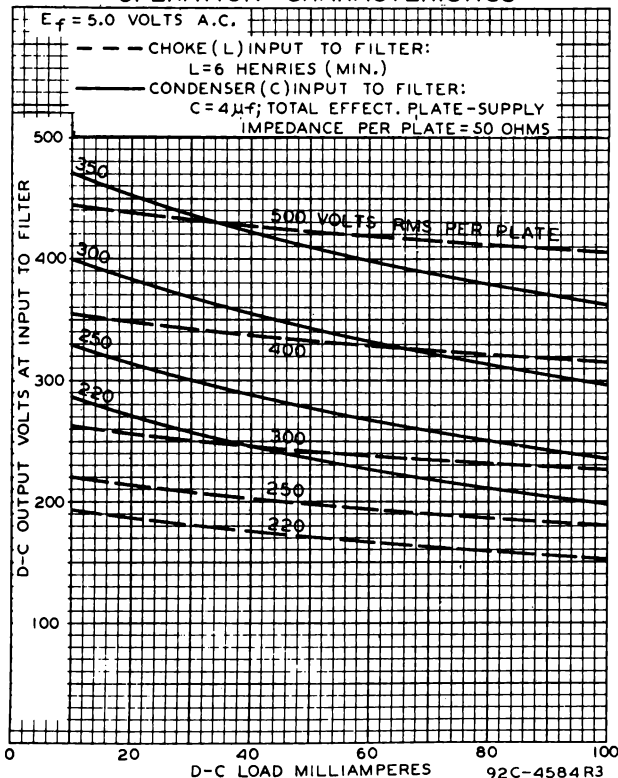
DATA

5W4
5X4-G



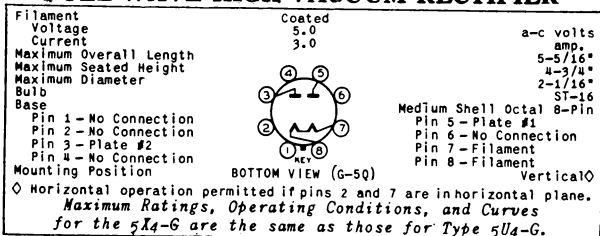
5W4

OPERATION CHARACTERISTICS



5X4-G

FULL-WAVE HIGH-VACUUM RECTIFIER



Mar. 20, 1943

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA



5X8

5X8

TRIODE-PENTODE CONVERTER

9-PIN MINIATURE TYPE

*Intended for use in equipment having
series heater-string arrangement*

The 5X8 is the same as the 6X8 except for the following items:

Heater, for Unipotential Cathode:

Voltage	4.7	 ac or dc volts
Current	0.6	 amp
Warm-up time (Average).	11	 sec

For definition of heater warm-up time and method of determining it, see sheet HEATER WARM-UP TIME MEASUREMENT at front of this section.

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode	200 max. volts
Heater positive with respect to cathode	200 [▲] max. volts

[▲] The dc component must not exceed 100 volts.



5Y3-G, 5Y3-GT

FULL-WAVE VACUUM RECTIFIER

5Y3-G
5Y3-GT

GENERAL DATA

Electrical:

Filament, Coated:

Voltage.	5	ac volts
Current.	2	amp

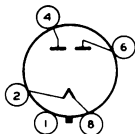
Mechanical:

Mounting Position. Vertical, or Horizontal with pins
2 and 8 in horizontal plane

	5Y3-G	5Y3-GT
Maximum Overall Length . . .	4-5/8"	3-3/8"
Maximum Seated Length. . . .	4-1/16"	2-13/16"
Maximum Diameter	1-13/16"	1-5/16"
Bulb	ST-14	T-9
Base	{ Med.-Shell Octal 5-Pin	{ Inter.-Shell Octal 5-Pin

Basing Designation for BOTTOM VIEW G-5T

Pin 1-No Connection
Pin 2-Filament
Pin 4-Plate No.2



Pin 6-Plate No.1
Pin 8-Filament

FULL-WAVE RECTIFIER

Maximum Ratings, Design-Center Values*

PEAK INVERSE PLATE VOLTAGE	1400 max.	volts
PEAK PLATE CURRENT PER PLATE	400 max.	ma
AC PLATE SUPPLY		
VOLTAGE (RMS) PER PLATE.	See Rating Chart	
DC OUTPUT CURRENT PER PLATE.	See Rating Chart	
HOT-SWITCHING TRANSIENT		
PLATE CURRENT PER PLATE		
For duration of 0.2 second maximum . . .	2.2 max.	amp

Typical Operation with Capacitor-Input Filter:

AC Plate-to-Plate			
Supply Voltage (RMS)	700	1000	volts
Filter-Input Capacitor	10	10	μf
Total Effect. Plate-Supply			
Impedance Per Plate.	50	140	ohms
DC Output Voltage at Input			
to Filter (Approx.):			
At Half-Load Cur. of { 62.5 ma. . .	390	-	volts
42 ma. . .	-	610	volts
At Full-Load Cur. of { 125 ma. . .	350	-	volts
84 ma. . .	-	560	volts
Voltage Regulation, Half-Load			
to Full-Load Current (Approx.). .	40	50	volts

5Y3-G
5Y3-GT



5Y3-G, 5Y3-GT

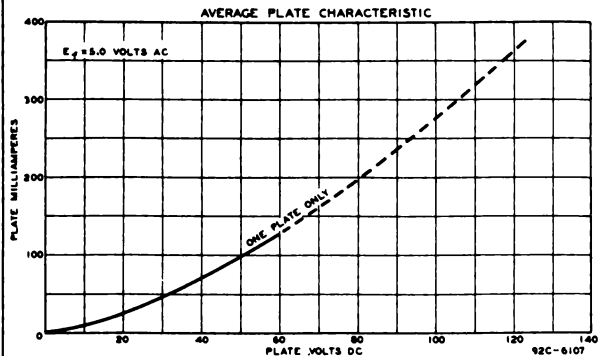
FULL-WAVE VACUUM RECTIFIER

Typical Operation with Choke-Input Filter:

AC Plate-to-Plate			
Supply Voltage (RMS)	700	1000	volts
Filter-Input Choke	10*	10**	henries
DC Output Voltage at Input to Filter (Approx.):			
At Half-Load Cur. of { 75 ma.	270		volts
62.5 ma.	-	405	volts
At Full-Load Cur. of { 150 ma.	245		volts
125 ma.	-	390	volts
Voltage Regulation, Half-Load to Full-Load Current (Approx.)	25	15	volts

* This value is adequate to maintain optimum regulation in the region to the right of line L=10H on curve OPERATION CHARACTERISTICS with Choke-Input to Filter, provided the load current is not less than 35 ma. For load currents less than 35 ma., a larger value of inductance is required for optimum regulation.

** This value is adequate to maintain optimum regulation in the region to the right of line L=10H on curve OPERATION CHARACTERISTICS with Choke-Input to Filter, provided the load current is not less than 50 ma. For load currents less than 50 ma., a larger value of inductance is required for optimum regulation.



RATING CHART AND OPERATION CHARACTERISTICS

The *Rating Chart* presents graphically the relationships between maximum ac voltage input and maximum dc output current derived from the fundamental ratings for conditions of capacitor-input and choke-input filters. This graphical presentation gives the equipment designer considerable latitude in choice of operating conditions.

The *Operation Characteristics for Full-Wave Circuit with Capacitor-Input Filter* show not only the typical operating curves for such a circuit, but also show by means of boundary lines "ADK" the limiting current and voltage relation-



5Y3-G, 5Y3-GT

FULL-WAVE VACUUM RECTIFIER

5Y3-G
5Y3-GT

ships presented on the Rating Chart.

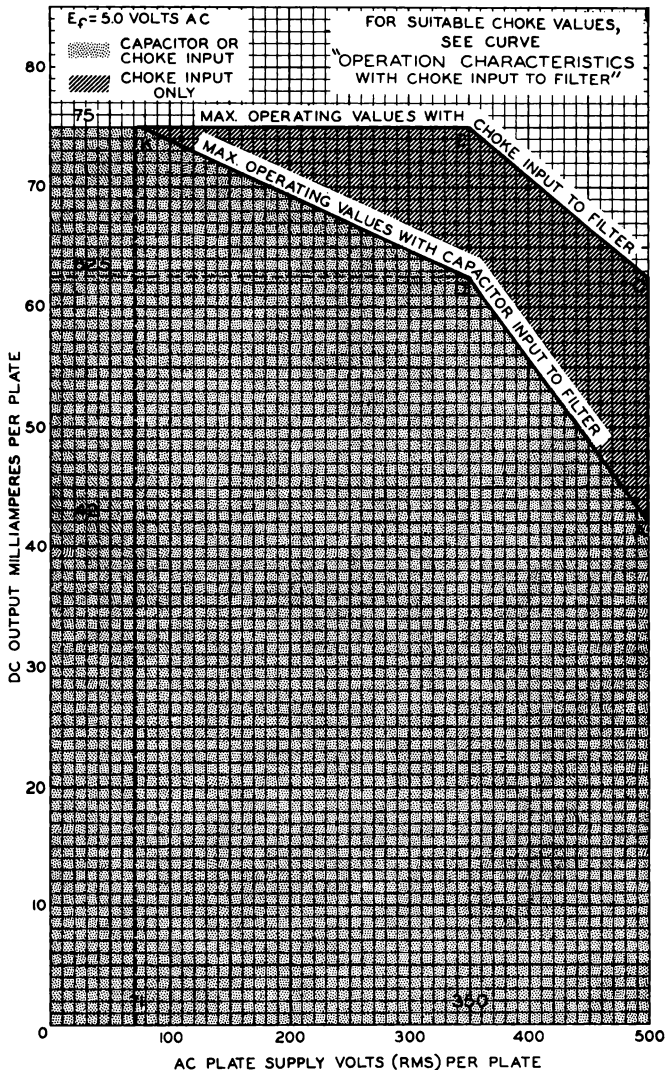
The *Operation Characteristics for Full-Wave Circuit with Choke-Input Filter* show the typical operating curves for such a circuit. They not only show by means of boundary line "CEK" the limiting current and voltage relationships presented on the *Rating Chart*, but also give information as to the effect on regulation of various sizes of chokes. The solid-line curves show the dc voltage outputs which would be obtained if the filter chokes had infinite inductance. The long-dash lines radiating from the zero position are boundary lines for various sizes of chokes as indicated. The intersection of one of these lines with a solid-line curve indicates the point on the curve at which the choke no longer behaves as though it had infinite inductance. To the left of the choke boundary line, the regulation curves depart from the solid-line curves as shown by the representative short-dash regulation curves.

5Y3-GT



5Y3-GT

RATING CHART



NOV. 1, 1949

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

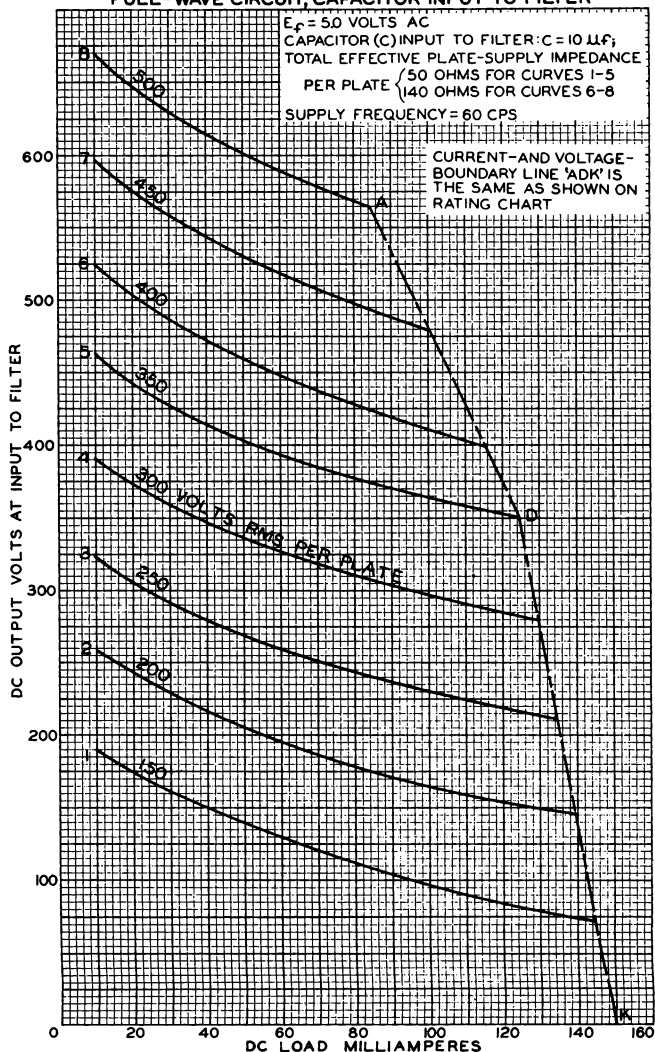
92CM-7396



5Y3-GT

5Y3-GT

OPERATION CHARACTERISTICS FULL-WAVE CIRCUIT, CAPACITOR INPUT TO FILTER



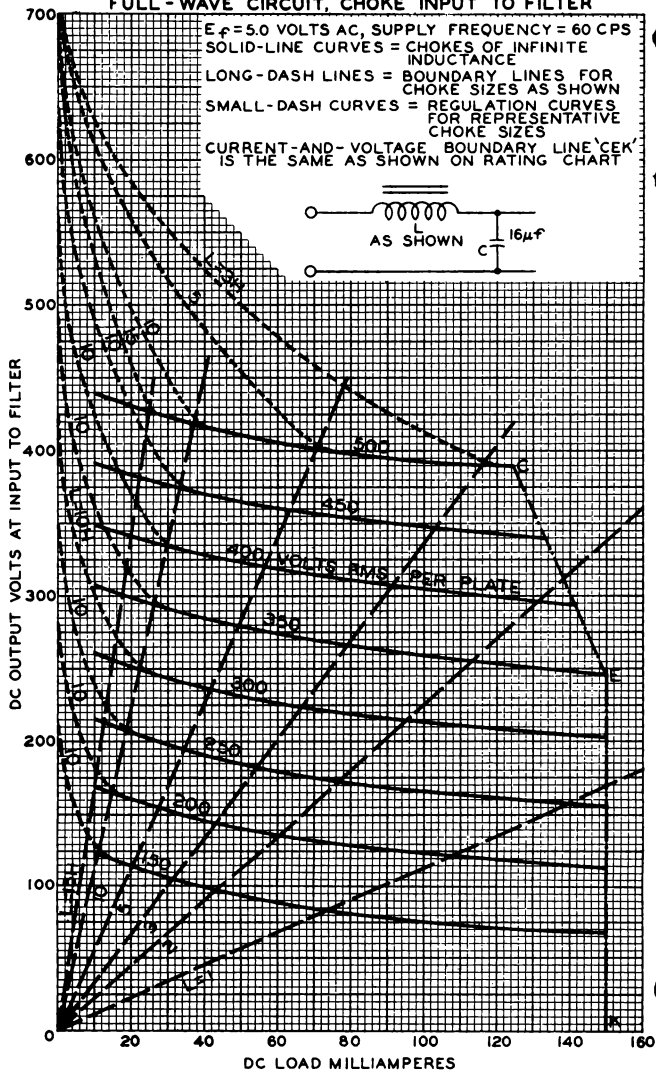
5Y3-GT



5Y3-GT

OPERATION CHARACTERISTICS

FULL - WAVE CIRCUIT, CHOKE INPUT TO FILTER



OCT. 26, 1949

 TUBE DEPARTMENT
 RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7394



5Y4-G

FULL-WAVE VACUUM RECTIFIER

5Y4-G
5Y4-GT

The 5Y4-G is the same as the 5Y3-G except for the following items:

Mechanical:

Mounting Position Vertical, base up or down, or
Horizontal with pins 2 and 7 in horizontal plane

Base Medium-Shell Octal 8-Pin (JETEC No.B8-11)

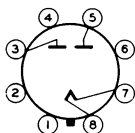
Basing Designation for BOTTOM VIEW. 5Q

Pin 1—No Connection

Pin 2—No Connection

Pin 3—Plate No.2

Pin 4—No Connection



Pin 5—Plate No.1

Pin 6—No Connection

Pin 7—Filament

Pin 8—Filament

5Y4-GT

FULL-WAVE VACUUM RECTIFIER

The 5Y4-GT is the same as the 5Y3-GT except for the following items:

Mechanical:

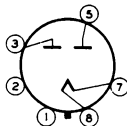
Mounting Position Vertical, base up or down, or
Horizontal with pins 2 and 7 in horizontal plane

Base Intermediate-Shell Octal 6-Pin (JETEC No.B6-8),
or Short Intermediate-Shell Octal 6-Pin (JETEC No.B6-48)

Basing Designation for BOTTOM VIEW 5Q

Pin 1—No Connection

Pin 2—No Connection



Pin 3—Plate No.2

Pin 5—Plate No.1

Pin 7—Filament

Pin 8—Filament

5Z3



5Z3

FULL-WAVE VACUUM RECTIFIER

The 5Z3 is the same as the 5U4-G except for the following items:

Mechanical:

Mounting Position. Vertical, base up or down, or
Horizontal with pins 1 and 4 in horizontal plane

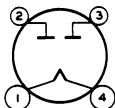
Maximum Overall Length 5-3/8"

Base Medium-Shell Small 4-Pin (JETEC No.A4-9)

Basing Designation for BOTTOM VIEW 4C

Pin 1 - Filament

Pin 2 - Plate No.2



Pin 3 - Plate No.1

Pin 4 - Filament



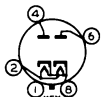
5Z4



5Z4

FULL-WAVE HIGH-VACUUM RECTIFIER

Heater	Coated Unipotential Cathode	
Voltage	5.0	a-c volts
Current	2.0	amp.
Maximum Overall Length		3-1/4"
Maximum Seated Height		2-11/16"
Maximum Diameter		1-5/16"
Bulb		Metal Shell, MT-8
Base		Small Wafer Octal 5-Pin
Pin 1-Shell		Pin 6-Plate #1
Pin 2-Heater		Pin 8-Heater &
Pin 4-Plate #2		Cathode
Mounting Position		Any



BOTTOM VIEW (5L)

FULL-WAVE RECTIFIER

Peak Inverse Voltage	1400 max. volts
Peak Plate Current per Plate	375 max. ma.
<u>With Condenser-Input Filter:</u>	
A-C Plate Voltage per Plate (RMS)	350 max. volts
Total Effective Plate-Supply Impedance per Plate [▲]	50 min. ohms
D-C Output Current	125 max. ma.
<u>With Choke-Input Filter:</u>	
A-C Plate Voltage per Plate (RMS)	500 max. volts
Input-Choke Inductance	5 min. henries
D-C Output Current	125 max. ma.

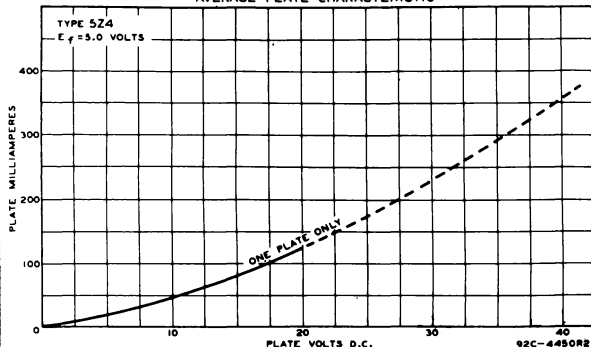
[▲] When a filter-input condenser larger than 40 μ f is used, it may be necessary to use more plate-supply impedance than the minimum value shown to limit the peak plate current to the rated value.

HALF-WAVE RECTIFIER

As a half-wave rectifier, the 5Z4 may be operated with plates connected in parallel at the socket. Two 5Z4's so connected in a full-wave circuit will deliver twice the d-c output current obtainable from one tube. In this service the allowable voltage and load conditions per tube are the same as for full-wave service.

← Indicates a change.

AVERAGE PLATE CHARACTERISTIC



Sept. 2, 1941

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

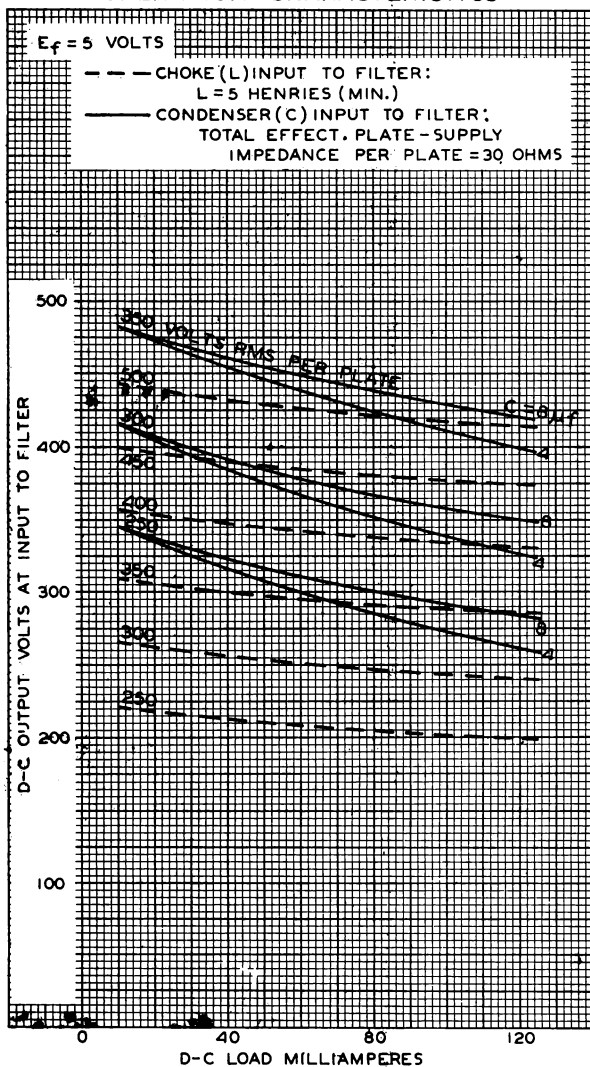
DATA

5Z4



5Z4

OPERATION CHARACTERISTICS



DEC. 5, 1939

RCA RADOTRON DIVISION
RCA MANUFACTURING COMPANY, INC.

92C-4430R2